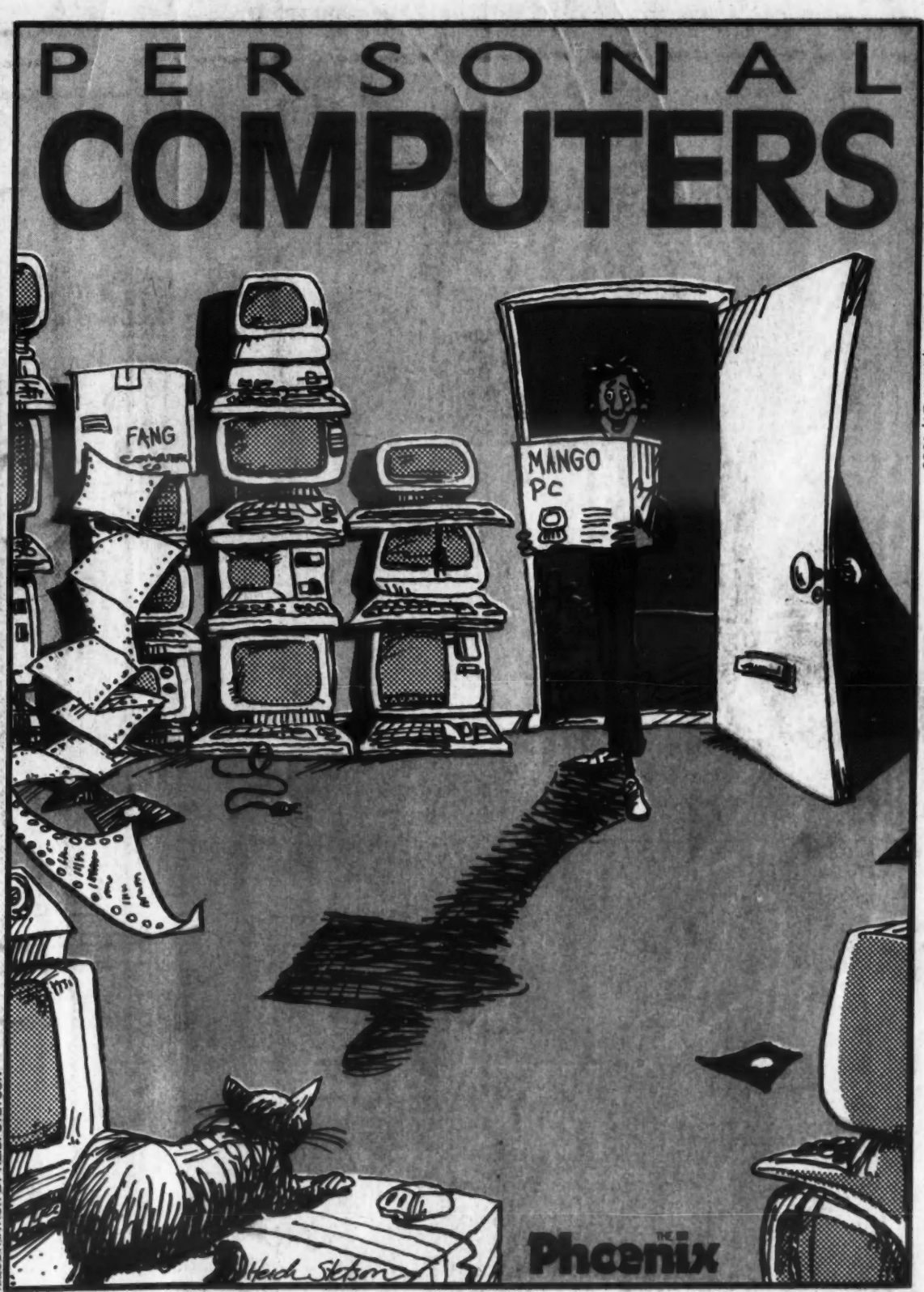
PERSONAL COMPUTERS

SUPPLEMENT TO THE BOSTON PHOENIX, MAY 21, 1985



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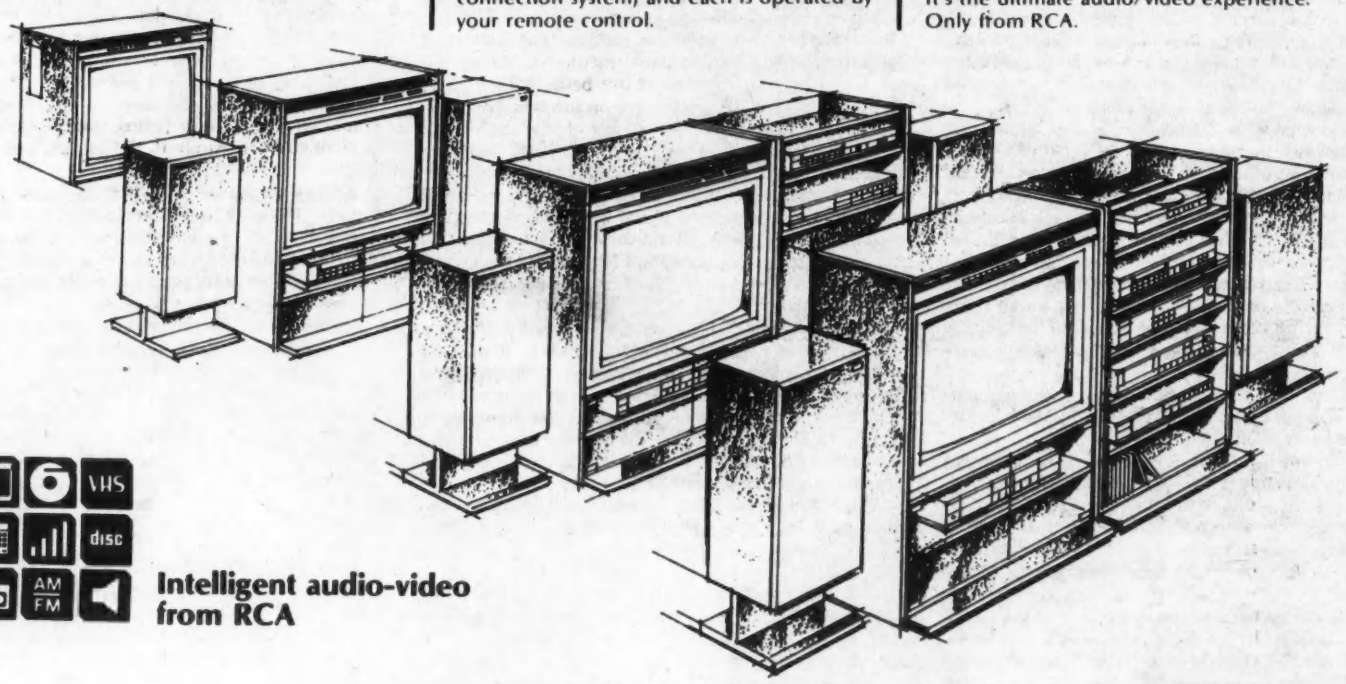

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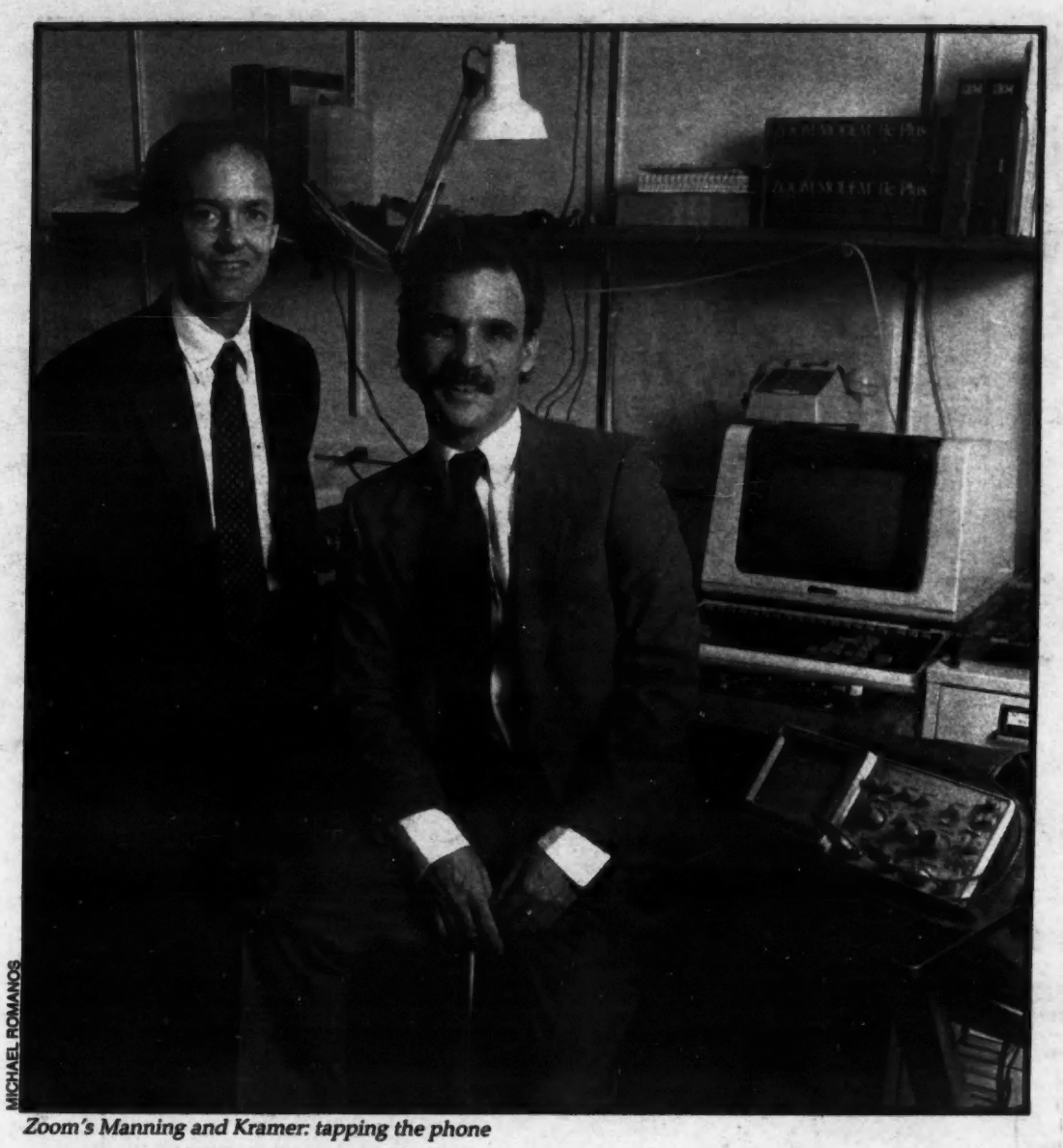

MICHAEL ROMANOS

Zoom's Manning and Kramer: tapping the phone

Dialing for dollars

Zoom makes a fortune on phones

by Paul Lehrman

Out in Silicon Valley, in California, and all along Route 128, computer manufacturers have begun to panic. The boom in home-computer sales looks like it's just about over, and companies that have gotten used to 200-percent annual-growth curves must face the fact that theirs is no longer an industry with infinite potential. But some companies — especially smaller, applications-oriented software and peripheral-hardware makers — remain as optimistic as ever.

One such company is Zoom Telephonics, an eight-year-old enterprise that takes up three floors of an old warehouse on South Street in downtown Boston. As far as Zoom and its 31 employees are concerned, one area of the market is still a long way from being saturated: telecomputing. And Zoom's customers are not afraid to put their money where the company's mouth is — in the last four years, Zoom's annual revenues from telephone and telecomputing accessories have gone from $200 thousand to $5.9 million, and *Inc.* magazine placed the firm 59th on its list of America's fastest-growing private companies.

Zoom has fast built a solid reputation for its low-cost, reliable, user-friendly computer modems and communications software, but it has taken a long time to get into the personal-computer market — even though, according to its president, Frank Manning, that was the company's goal all along. After a shaky start designing products such as an automatic music composer and a digital monitor for gas-station pumps, Manning, along with his former MIT roommate, Bruce Kramer (who is no longer active in the company but is back at MIT as a professor), and Kramer's younger brother Peter (who arrived in Boston after earning a master's degree in painting in New York), hit upon the idea of a telephone-bell silencer.

"My brother, who ran a chain of gas stations in St. Louis, suggested it," says Manning. "He would get up early and do his rounds, then go home and take a nap. He didn't want to be disturbed, but he also didn't want to take the phone off the hook for a long time. This way, the callers would just figure he was still out, and if it was important they'd call back later."

The Silencer, which came out in November 1977, was a good idea, but marketing it turned out to be quite a task. "We took it to Bloomingdale's," says Manning, "and they wanted to know why someone wouldn't just buy an answering machine. Our response was that while an answering machine at that time cost about $200, this thing sold for 10 or 15 bucks." Peter Kramer, now vice president of the company, adds, "The telephone is the only appliance in the house that doesn't have an on-off switch. And with an answering machine you have to respond to the calls, whether you want to or not." Another advantage, says Manning, one that he was fond of pointing out to customers, was, "If you don't answer, the phone company doesn't get paid for the call."

Bloomingdale's accepted the product, but instead of offering it in its telephone department, sold it over the store's gift counter. "It worked out better for us," says Manning, "because the gifts were on the first floor."

Next, the trio took the device to a mail-order convention in New York, where it was received enthusiastically by catalogue publishers ("We were already counting our money," recalls Peter Kramer), but real sales didn't match the initial response. Getting the word out through other channels was a challenge. "We got on the phone to *Esquire* and *Playboy*, and they wrote about it. But we couldn't afford to take out ads," says Peter Kramer.

Eventually, things did pick up, especially after the FCC's decision to allow users to tack their own equipment onto phones without having to use expensive (and basically useless) couplers began to have an effect on public consciousness. Also helpful was some major companies' introduction of the device in their own products; GTE, for example, offers an optional Silencer in every telephone it sells to its retail customers. The product was also sold to the Radio Shack chain for sale under the store's brand, and a number of prestigious mail-order catalogues listed it.

Still, says Manning, "we thought the Silencer would make a lot more revenue than it did." But he points out that when a $10 item is sold wholesale at 45 percent of its retail price, "you have to sell a lot to make a big company." Nevertheless, Zoom took advantage of its experience selling the device, using what it learned to move on to bigger and better things. "We learned a lot about the business, and it got us into that world," says Peter Kramer. Manning adds, "It let us have a prototype of a company. It allowed us to build a rep network for our next product."

That next product, the Demon Dialer, was four years in the making. In the meantime, says Manning, "we ran an extremely lean operation. We didn't pay ourselves much. It was a big gamble, but it paid off." The Demon Dialer is a "black box" automatic dialer that the user controls from a standard telephone. It is designed so that one box can serve all of the extensions hooked into the line. Besides holding 176 numbers in its memory, it will automatically re-dial a busy number until it gets through.

Like the Silencer, the Demon was inspired by a personal need — in this case, Manning's desire to get tennis-court time at MIT. "You have to make reservations exactly at noon," he says, "and so everyone would be calling at the same time. This way you could get through as soon as there's the slightest opening in the line." (This reporter can vouch for the validity of the concept. I recently used a memory dialer to get tickets to see the Grateful Dead. Sort of the high-tech equivalent of camping out all night in front of the box office.)

In addition, the Dialer will pause and listen for response tones from long-distance services, making accessing them become a single-step operation. "People at trade shows wanted pause features in dialers for long-distance services," says Peter Kramer, "but we do them one better — ours actually hears the tone and responds to it by finishing the number."

At an original price of $200 (which has since been reduced to $150) the Demon Dialer sold well, and Manning says that most major providers of office-telephone networks now offer it to their customers as part of their system packages. Within a year Zoom's revenues had gone up 400 percent. But, once again, the owners of the company were not satisfied. The experienced gained, they say, was as useful to them as the money was. "The Silencer taught us about consumer channels, while the Demon taught us about office channels," says Peter Kramer. In so doing, it opened the way for distribution of more advanced products through office-supply companies. "Once you're a qualified supplier to them," explains Peter Kramer, "it's easy to get new products into their catalogues."

The company developed two smaller versions of the Demon for the home market: a 93-number model that now sells for $99, and a $60 "Hot Shot," which has memory for only one number and is useful for alternative long-distance service. Now that many phone exchanges are installing "equal access," which gives customers one-number dialing for the long-distance service of their choice, the dialer market may shrink a bit, but Zoom still considers it a viable one to tap into. "Long-distance companies that offer equal access have to pay the local phone company an access charge," explains Manning. "That cost is passed on to the customer. But there are literally hundreds of long-distance services that don't promote themselves that are considerably cheaper. You'll still need to dial all those numbers to get them, however, and that's where the dialers can come in."

For the most part, however, Zoom considers the dialer market a way to bring it just another step closer to what it has always wanted to do. "We wanted to make a major move into modems," says Manning. "We were hooked up to the phone network, we were good with microprocessors, we had good customer support and marketing in place, and we had the expertise in how to get stuff into offices — we had 500 field installers available."

"Most modem companies dealt in industrial accounts," adds Peter Kramer, "and their products were not friendly to use and were not attractive. The companies were not used to responding to end users." "They would do modems as hardware," says Manning, "and would do software because they felt they had to. We wanted to do it as a package, without any surprises to the customer — like he would get it home and discover he had to buy a super-serial-card to hook it up."

The modem market for home-computer owners looked largely untapped. "Only 20 percent of PC users have modems," says Manning, "and we wanted to know, 'Why so few?' One answer was because people don't know what they can do. So we came up with a poster that can go up in a computer store showing 100 uses for a modem. The other answer was cost. While computer prices were falling, there was only modem available for an Apple II, the Hayes, and that sold for $329."

Zoom's response to all of this was to release, in October 1983, the Networker, a 300-baud modem for the Apple II series of computers, with a list price of $129, which included software. It was a big hit. "We've gotten better sales per store than any other 300-baud modem," Manning reports.

There were several reasons for going with Apple computers at the start. Says Manning, "We like the IIe. We thought it was going to remain viable, and there was a real niche for a low-price modem." Besides, the IBM market was already being flooded with modems of all stripes. Furthermore, anyone who uses Zoom's modems knows that the company's product philosophy is very similar to that of Apple, in that the packages are easy to use from the outset, but have enough versatility to satisfy the more advanced hacker. "We want to make it extremely likely," says Manning, "that when someone gets the product it will work." Zoom is also committed to giving the buyer something to *do* with the thing as soon as it's plugged in, so the company offers free introductory subscriptions to the Dow Jones News Retrieval, Newsnet, and Delphi data bases.

Following on the heels of the Networker, and in response to users' needs, Zoom introduced the Zoom/Modem IIe. The new model is compatible with Hayes products and has similar features, including automatic dialing and answering. The price is steeper than that of the first model — $179 with basic communications software and $229 with advanced software — but it's still considerably cheaper than what the competition offers, and the deluxe version has some unique and valuable features.

"The software lets your computer act as terminal," says Manning, "and upload and download files. It lets you do disk-to-disk file transfer with another computer, and it has the Xmodem protocol built in." Xmodem is fast becoming standard communications protocol for microcomputers because it accommodates file transfers

Continued on page 12

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Out in the cold

The abandonment of CP/M

by Charles Bloche

If you set Jay Sage talking about computer operating systems, don't expect dry arcana — he's fighting a holy war. "People like me are zealots proselytizing for CP/M," warns the Newton physicist before launching into his refrain, "There's very little fundamentally important you can do on an IBM that you can't do with a CP/M system for a bargain price." He knows his cause — the CP/M system for eight-bit machines — may be hopeless; computer progress has already passed him by. But Sage still champions what the industry rejects as outmoded software for an obsolete computer, in a world of consumers hungry for the latest, sexiest advance.

A disk operating system (DOS) is the basic level of software mediating operations between the application program and the mechanical functions of a computer. Before IBM entered the microcomputer market in 1982, most office machines that ran word processors, spreadsheets, and data bases could digest eight bits of information at once, and usually used CP/M. Then IBM sparked the explosion of the micro market by introducing its more powerful, 16-bit personal computer and its attendant operating system, PC-DOS. Industry analysts agree that from that day, CP/M was doomed. Few vendors continued to write software for the system; some users junked their machines and traded in for PC-DOS. Loyal devotees like Jay Sage are the last druids left to tend a dying flame.

Pioneers on the technology frontier know that when they settle down they're left behind. Common wisdom holds that microcomputer technology evolves at a lightning rate; as surely as CP/M has neared extinction, PC-DOS will eventually follow. But such digital Darwinism is at least partially the rationalization of an industry addicted to innovation — even when innovation fails to mean progress. The decline and fall of CP/M has more to do with the vagaries of computer marketing than with the technological superiority of the products that have replaced it. CP/M is dying an unnatural, early death.

Its proponents say CP/M is good enough for the most popular computer functions: word processing, accounting, mass mailing, and programming. Machines like the IBM PC and the 32-bit Apple Macintosh pack extra power, but often spend that potential on making existing functions easier to use rather than more powerful. The Macintosh word processor, Macwrite, for instance, has fewer features than many CP/M programs.

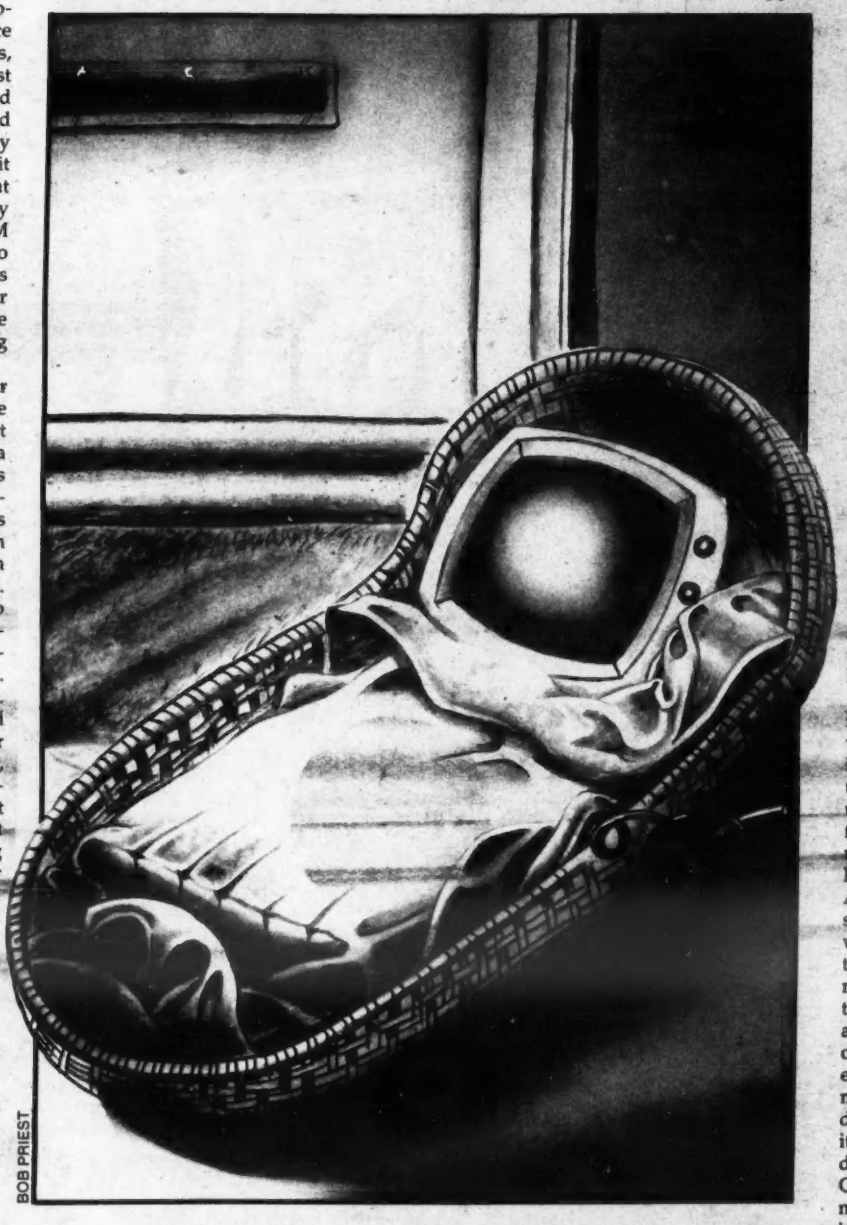
An eight-bit machine can access only 64 kilobytes of memory, much less than the newer computers. But Sage scoffs at this limitation. "If a software developer has a lot of memory, he writes programs bigger, slower, sloppier. Who cares? Who knows? That's what's happened in the IBM world. This is the amazing thing: stuff that takes 512K on a PC runs beautifully on 64K on CP/M/."

Although the eight-bit Z80 chip that runs CP/M is less powerful than the 16-bit 8088 chip in IBM machines and IBM clones, new advances in eight-bit technology can actually make it run faster and more powerfully. There *are* some things — such as integrated programs, artificial intelligence, and multi-user networks — that CP/M just hasn't the memory to do. Yet Jim Byram, director of the CP/M Users' Group of the Boston Computer Society, says, "When there's one person using one machine to do a defined task, there really isn't a lot of difference." CP/M, with its lower price, is a more efficient technology. And Byram adds emphatically that his souped-up CP/M machine is fast enough to "blow a PC out of the water."

Industry experts don't argue. "CP/M is a perfectly good operating system," says Chris Christiansen, senior analyst for the Yankee Group, a high-tech market-research firm in Boston. "You can do great things with Z80s too. Those machines had a long way to go in development before being foreshortened by the IBM PC architecture." The Z80 processors can even be rigged to address more than the current limit of 64K of memory.

But it nevertheless seems that CP/M is through. Digital Research, the company that wrote CP/M, now makes 88 percent of its profits from other programs, says Byram. Christiansen adds: "There are still a few people writing CP/M software, but not too many. The machines are dying off. There's not much money in it." Micropro, the creators of possibly the single most popular CP/M program, the Wordstar word processor, now draws less than five percent of its profits from CP/M sales, and expects that figure to go down to zero by mid-1987, according to Robert Lefkowits, director of software research for Infocorp, a California consulting firm. "There is no future for doing CP/M. Period. Point blank. End of story."

For those who equate the high-tech business with the blazing trail of progress, the sad fate of CP/M is a lesson in the distorting effects of the market place. Even in high-tech, innovation and efficiency don't necessarily spur sales.



BOB PRIEST

In 1982, CP/M was hot — "the most widely used operating system for microcomputers," according to the 1982 edition of the *Osborne CP/M User Guide*. The reason was simple, said the guide: an "upward spiral of sales leading to more tools leading to more applications programs leading to more sales has continued unabated for several years now, and shows no signs of stopping." Its huge pool of software made CP/M the de facto industry standard because every computer company wanted its computer to be able to use the ready-made programs that would only run on CP/M. Announcing its own new microcomputer, IBM wisely joined the crowd and offered a 16-bit version of the PC.

But Digital Research didn't deliver its 16-bit version of CP/M on time. Instead, IBM turned to another company, Microsoft, which had already secured a spin-off of CP/M for IBM's chip. This was MS-DOS, which eventually became PC-DOS. With this in hand, and 16-bit CP/M still only on the drawing board, programming entrepreneurs chose to write their software for the operating system that was a sure bet. Christiansen is blunt: "CP/M ran out of steam because Digital Research blew it."

There is no doubt that PC-DOS has benefited from IBM's immense marketing clout. But in 1982, there were still more CP/M than PC-DOS machines. services for CP/M owners have shriveled. And buyers have followed the trend and moved away from eight-bit machines.

The easy conclusion is that CP/M has been superseded by a superior technology. But even now, as the Z80 withers, the eight-bit Apple II line and its software remain highly popular. "That's eight-bit technology, but it's selling like gangbusters," says Lefkowits. "There are companies still making a bundle on Apple II software, even though that machine is even more limited from a software developer's standpoint than the Z80." What made Apple and broke CP/M was the strange structure of the software market.

Even as computer manufacturing has become dominated by a few large companies, computer software has remained decentralized and highly competitive. It makes sense: there is less start-up cost involved in writing and distributing programs than in building an assembly line to make machines. "It's very difficult to get money," says Christiansen. "People have lost big money in this industry, and they're very leery of anything connected with [micros]."

A company that has only enough money to perfect one version of its program will pick the disk operating system with the biggest market potential. This had always been the key to CP/M's spiral of success. But statistics show that most software is bought to go with a new computer, says Jeanne Dietsch, an analyst with Link Resources. People who bought IBM PCs last year, for instance, purchased an average of 1.05 word processing programs each, but those same consumers are expected to buy only each next year. The lesson for struggling software manufacturers is clear. The biggest market for software is in supplying programs for the newest, best-selling machines, rather than in supporting systems that people already own.

The declining prices of eight-bit computers also turned software developers away from CP/M, Christiansen adds. As a computer becomes a better bargain, it is less likely to attract new development. "When a machine costs less than $1500 you have a problem selling any software over $100, and real profits in this industry are made on $500-to-$700 software packages," he says. The slump in sales of new hardware has only intensified this competition; programmers seek the quick fix of profit to establish themselves — they prefer to write for the most expensive and the newest machines.

So why has the Apple II software market remained healthy? The advantage of the Apple II over the CP/M computer — despite its inferior technology — has been its peculiar niche in the market. CP/M machines were primarily business systems, stressing the basic office functions, without graphics, color, or amusement value. The Apple II, on the other hand, appealed to home users. The expensive IBM PC never threatened the home domain of the Apple, even as it cut CP/M off at the pass. And Apple's software market has remained strong, despite competition from the PC Junior, IBM's home computer, because home users continue to buy programs after they buy their machines. "Apple users use their computers for business and personal productivity, but also for education and entertainment," says Dietsch. Largely because these owners are just as likely to buy education and entertainment programs in succeeding years as the first year, she says, "Apple has the highest market potential for software."

CP/M, on the other hand, is wavering into senescence, not because its brain is weak, but because the industry is giving it less and less to do. Jim Byram claims that there are over one million CP/M users. Although their machines possess far greater potential than most of these users realize, software developers have little interest in helping them reach it. According to Byram, even Digital Research "hasn't done customer support worth a damn in years." Analysts agree that the last of the CP/M buyers see their machines as low-budget, single-function tools, primarily word processors. They are rarely interested in new software, often getting the only programs they'll ever use bundled in deals with their new machines. For reasons that have little to do with the capacity of the processor or its operating system, the computer industry and consumers have abandoned CP/M as a well run dry. Technology and market forces don't necessarily advance in the same direction. Tantalized by the rewards of constant innovation, suppliers are disinclined to exploit the potential of computers that have already been bought.

The realization of CP/M's potential has been left to hobbyists like Byram and Jay Sage; they face the task with the zeal of converts. "The IBM world is business-oriented, profit-oriented," argues Sage. "They just want money. Who's got money. You can sell garbage for the IBM PC and somebody's gonna buy it. CP/M is a much more selective market." Sage claims that fellow hobbyists are steadily developing new programs — all public domain, all free. He points to ZCPR3, a powerful CP/M enhancement, which he gives away for free over his bulletin board system (Newton Center Z-Node, 965-7259).

Sage and Byram say an enormous amount of CP/M software already exists for almost any application. Nevertheless, they both recognize the industry has passed them by. You might even suspect they're glad. They will continue to tinker, making modifications and bringing new believers into the fold. And through it all, CP/M believers will reserve a special scorn for thier powerful enemy. "If all you're going to do is *use* a computer," says Sage, "if you're going to buy all your software, if you're not going to muck around inside, then you probably ought to buy an IBM." He says this craftily, throwing it out as a challenge. But he knows that, sooner or later, you will probably succumb. □

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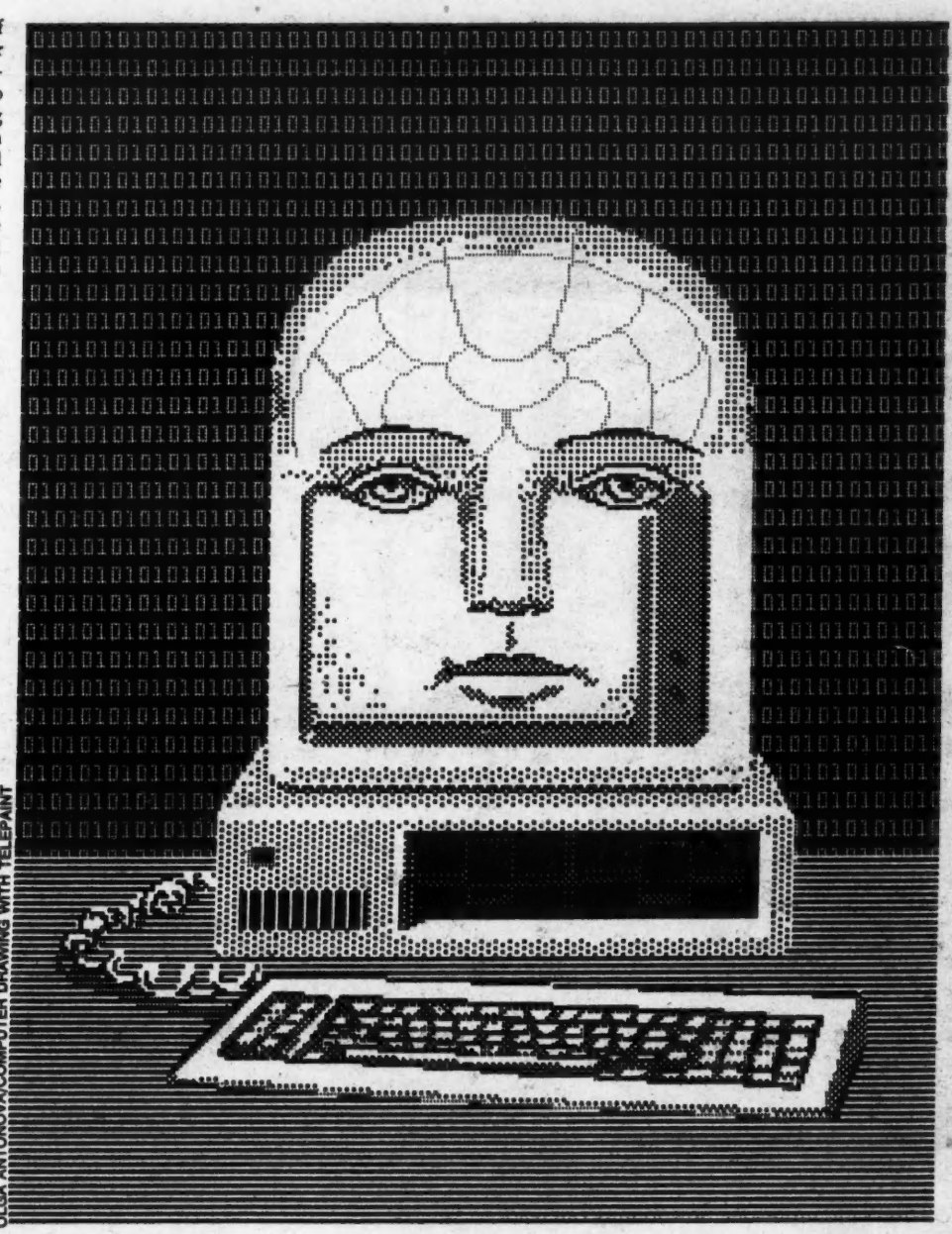


OLGA ANTONOVA/COMPUTER DRAWING WITH TELEPAINT

Marriage of true minds

Teaching computers to think like us

by Michael Bloom

For some, the fascination of computers lies in their absolute, inhuman certainty. By translating all data into binary code and using exacting Boolean logic, computers can calculate to an unprecedented degree of precision. They have extracted physical constants, such as pi, as accurately as one part in a googol or better and have found prime numbers greater than the number of particles in the known universe.

But such technologically impressive feats are hardly relevant to the sorts of questions most of us face day to day. We seldom have problems with such cut-and-dried solutions; the human condition is fraught with uncertainties that are best expressed as probabilities or as conditional statements dependent on context. This kind of thinking is not amenable to conventional digital technology, which recognizes only one or zero, on or off, yes or no.

"Fuzzy logic," a disarmingly titled but extremely powerful new discipline, aims to present this more human mode of processing in a form the computer can handle. Also called elastic logic, it tries to quantify answers like "maybe" or "it depends." It attempts not only to recognize the proverbial shades of gray, but also to render them receptive to computer analysis. Fuzzy logic promises to provide computers with the insight to interpret the kinds of questions we really ask and with the vocabulary to give us the answers we really need.

This strange new field is the invention of Professor Lotfi A. Zadeh, a computer scientist at Berkeley. Zadeh's research in artificial intelligence has led him into semantics, the study of meaning. Trying to represent common-sense statements to the computer, he found relatively few sentences that could be interpreted precisely (he refers to these precise statements as "crisp"). Most sentences are loaded with what Zadeh calls "elastic constraints," concepts that are necessarily vague or approximate — descriptors like "long" and "short," qualifiers like "very," value judgments like "good." He needed a theory by which to account for the useful information conveyed in these imprecise statements, without allowing that information to contradict or overwhelm more precise data.

Zadeh found a workable approach in "fuzzy set theory," a branch of mathematics wherein it is postulated that one can't always tell whether something belongs to a given category. (Set theory in general was among the least utilitarian branches of math until not so long ago, but has lately lent itself to a host of computer applications, from data base design to search strategies.) This denies Aristotle's law of the excluded middle, one of the key tenets of formal logic. But it does not prevent logic from working; rather, it leads to a multi-valued logic, with possible results other than a hard yes or no. In fuzzy logic, there is an infinity of gradation between one and zero, or true and false.

A classic illustration of fuzzy logic's workings is the question of whether or not someone is tall. While height is an inherent property, tallness is a relative concept, without a crisp (in Zadeh's usage) definition. A conventional computer application might attempt to equate height and tallness and declare some arbitrary cut-off value, six feet, say, as its working definition. If a person's height is equal to or greater than that value, the computer says TALL = TRUE; otherwise, it says TALL = FALSE. This simplistic solution has the virtue of being very easily programmed, but it fails to evaluate other indicators of stature that enter into the human conception of tallness — personal strength or charisma, for example. A five-foot, 10-inch figure standing heroically, with a cape swirling behind him, is likelier to be perceived as taller than someone six feet, three, but with a pronounced slouch. The conventional program necessarily ignores these contextual clues. It similarly slights context in deciding that a six-foot basketball player, say, is "tall."

The computer implementation of fuzzy theory would begin by assigning to the object in question a function that describes its likelihood of belonging to a given class. This function might be calculated on some observed value of the object (like the measured height of the possibly tall person); it might be a product of some series of prior calculations. Or, the function might be assigned an arbitrary value or maintained as an unsolved variable, because the system knows it does not yet possess enough data to address the issue properly — it expects to refine this value later in the process.

Assume that we start with a mathematical function giving us a raw value for tallness, based on the subject's actual height. We then can use extra information from various fuzzy qualifiers to manipulate the function: if the subject were described as very tall, then we would take the square of the original function. Contextual clues also get figured in. We might watch for a condition like "subject plays basketball," in which case we would adjust the tallness score downward. When all of the extra factors have been applied, the resulting computation can be a more useful answer to the tallness question than merely "yes" or "no."

* * *

The computer applications called "expert systems" already work somewhat along these lines (Professor Zadeh has worked on expert-system theory), and they can answer questions more momentous than whether or not someone is tall. Among the most productive outgrowths of artificial-intelligence research, expert systems are an attempt to encode the specialized knowledge and the decision-making processes of human experts.

Typically, such a system consists of a large data base of facts, which are represented as rules for computation. Some of them may be what is mere common sense to us, like a direct inference of tallness from height (remember, nothing is obvious to a computer). Others seem incredibly petty, or barely relevant, but they represent facts that real experts have sometimes found important, so they too contribute to the score. A great many of the system's rules exist to govern the operation of other rules, usually by limiting the circumstances in which those other rules may be used. Though these processes are the most tedious to discover and to program, they give the system its power — they represent, as nearly as possible, the judgment inherent in human logic.

The best-known expert system is MYCIN, a program created to help hospital workers diagnose bacterial infections from physical observations and lab results. Like a good doctor, but unlike most computer programs, MYCIN can come up with provisional results from incomplete data; it can even hedge its bets when prescribing treatments. The rules it uses take the form IF ... THEN — for example, if the infection type is primary bacteremia, the suspected entry point is the gastrointestinal tract, and the site of the culture is one of the sterile sites, then there is reason (or some degree of likelihood) to suspect that the organism is *Bacteroides*. This rule does not contain every known symptom of a *Bacteroides* infection — other rules cover other symptoms — but its application within the whole complex helps to ensure that no reasonable possibility is overlooked because one symptom is absent.

Expert systems include rules to help the computer distinguish possibilities that are reasonable from those that are not. Even a large mainframe computer can't afford to re-evaluate each bacterium in its data base every time it acquires new information. The computer needs a strategy to purge itself of unlikely answers so that it can concentrate on the ones that are workable. One of the favored techniques is called "beam search," in which only the nodes that have scored the highest are tested further. It's as if the program were in the middle of a thicket containing all the possible solutions, with a vague idea of the direction to follow for the correct answer. So it shines a figurative flashlight in that direction, selecting only the objects that appear within the flashlight beam for continued processing.

When MYCIN reaches the end of its run, it may not have found a single answer that perfectly fits all known facts. But odds are that a human doctor faced with such a case might not have isolated a specific germ either. MYCIN's collection of rules distills thousands of empirical observations, and is still being improved; nevertheless, it's somewhat less proficient than an experienced doctor. Its principal advantages are the standard selling points of any automated system: the ability to perform up to specs, consistently, every hour of the day.

The greatest disadvantage of MYCIN, and other expert systems, is the initial human investment required. System development and testing for MYCIN took up several doctors' time for many months. They had to examine their own working methods very closely, reduce their experiences and intuitions to fairly simple steps, assign numeric values to these steps, and then fine-tune those values.

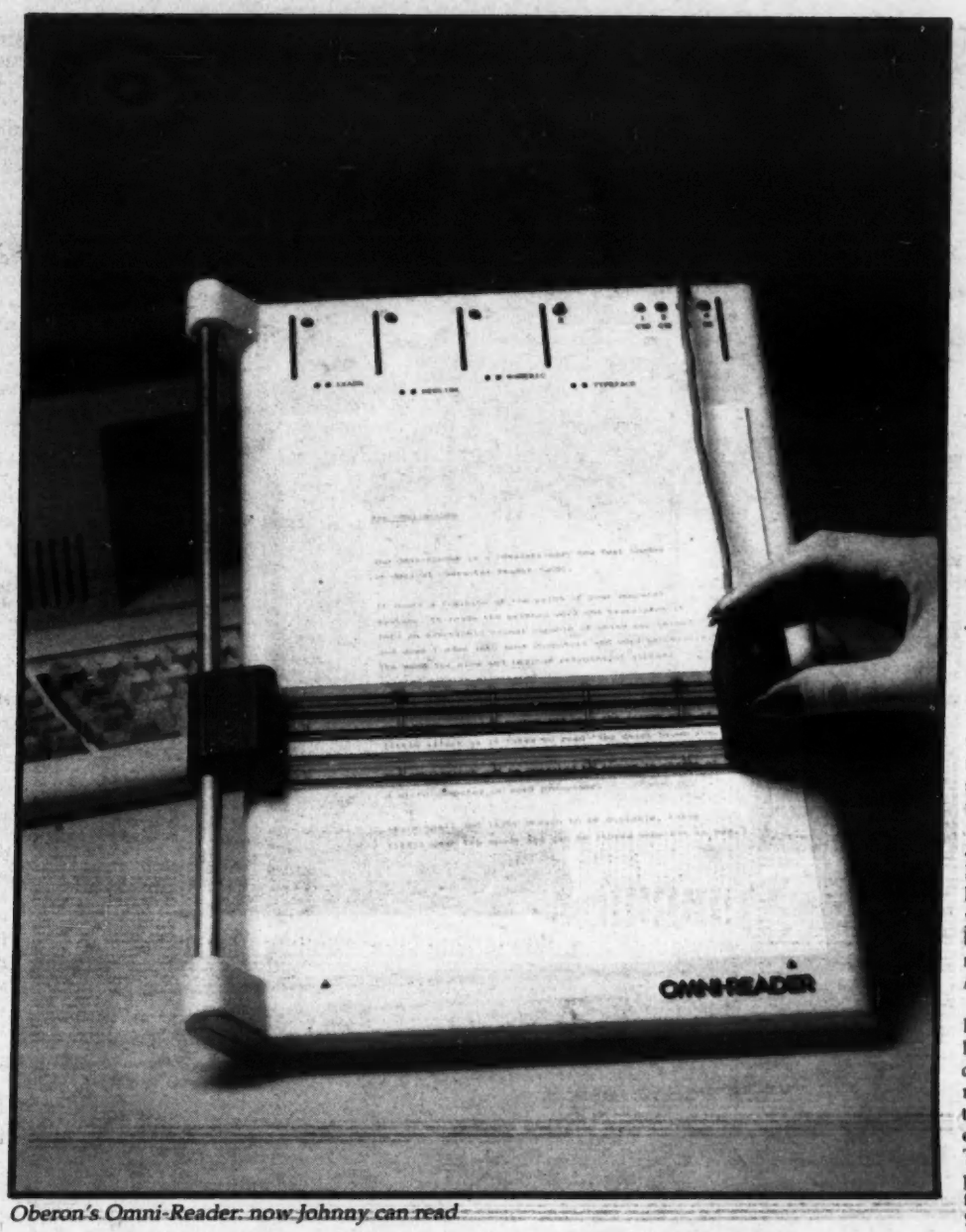
* * *

But fuzzy-logic methods seem to shorten development time significantly. The first system explicitly using fuzzy-logic design is already on line: F.L. Smidth, a Danish cement-kiln manufacturer, markets a computer program to monitor the reaction inside the kiln. The cement-making process involves searing limestone and clay inside a huge, rotating oven, and the variables include the quantity of raw ingredients fed into the oven, plus the temperature and rotation speed. The trained human kiln operators described their tasks in terms of "lime content high" or "kiln-drive torque low." Empirical observations enabled the programmers to define workable fuzzy-logic membership functions for these situations, and the procedure has now been completely automated. According to the London *Economist*, the computer controller pays for itself within a year.

Other fuzzy-logic industrial processes are being developed all the time. A process similar to the cement-kiln program monitors the operation of a paper mill. One Japanese team is testing a fuzzy locomotive engineer, intended to mediate the often-competitive values of passenger comfort, fuel economy, and safety. A robot welder in Bulgaria uses fuzzy logic to follow the welding seam, rather than conventional gray-scale signal processing.

There is even a fuzzy-logic-based product for business users: Reveal, marketed by the California software firm Tymshare. It can search large data bases for records to match complex criteria, and can evaluate these criteria elastically. Using conventional computer logic, a record that meets every condition but one would be passed over; business decisions, however, often involve compromises and a close fit will often suffice. Reveal can choose alternatives for which one criterion may be less than optimal, but for which the other conditions are superb.

Like many new developments, fuzzy logic has aroused no little controversy. Some logicians question whether it really ought to be considered a distinct discipline; they lump it with probability theory. But fuzzy logic's commercial success speaks for itself, and expert-system designers will certainly continue to employ its techniques. Beyond these utilitarian applications, artificial-intelligence researchers will continue to explore the semantic possibilities of fuzzy theory, possibly providing insight into human intelligence. Human thinking seems to be fuzzy (in the logical sense), so the computer model for elastic decision making may well have uses in psychology. Eventually, a fuzzy system may even pass the Turing test, evolving into an intelligent automaton whose thinking can't be distinguished from that of a human being. □



Oberon's Omni-Reader: now Johnny can read

Peripheral visions

Expanding the capabilities of the PC

by Peter W. Mitchell

Computers can do interesting and valuable things by themselves, but they become doubly valuable — and far more useful for practical tasks — when connected to "peripheral" or "I/O" (input/output) devices. Connecting a computer to a printer gives it the ability to produce permanent, tangible copies on paper of the evanescent information glowing on its screen. Connecting a modem allows the computer to communicate with other computers via the telephone network. And if you hook up a speech synthesizer, the computer can even talk.

New peripherals have recently been introduced that add other useful functions to the personal computer: the ability to read, the ability to capture a television image, and the ability to mimic other computers.

I/O devices depend on the fact that all personal computers use the same system of ASCII code numbers to represent text and punctuation. An input device accepts information, usually in human-generated form, and produces corresponding ASCII codes that the computer accepts, just as if the information had been typed on its keyboard. (The keyboard itself is an I/O device; of course, pressing a key closes an electronic switch, and each key generates a different ASCII code.) There are 127 standard codes, which cover most numerals, letters, and punctuation; the ASCII code number for lowercase "a," for example, is 97, and a comma is 44.

An output device translates these code numbers into some form of display that is useful to humans. For example, a speech synthesizer connects to a computer's RS-232 serial port, where a phone modem would normally be connected, and text is fed to it using a communications program. As the ASCII codes arrive at the synthesizer, it translates syllable-size sequences of codes into the phonemes (minimal vocal elements) of speech, and reproduces them through a built-in or external loudspeaker. Speech synthesizers retail for from $70 to $5000, with speech quality varying accordingly.

I/O devices that are used for control (rather than for transferring information) may operate directly via a special operating program rather than through ASCII codes. "Touch" screens are an example. There are two types of touch screens, but only one actually responds to touch; it employs a pressure-sensitive, transparent membrane that is installed over the screen of a conventional computer. The second type, used in Hewlett-Packard's excellent desk-top computer, employs an array of narrow, invisible infrared light beams that pass from left to right and from top to bottom just in front of the screen surface, each aimed at a corresponding detector at the opposite edge of the screen. When you touch (or almost touch) the screen with a finger in order to point at a particular spot on the display, your finger blocks two light beams, one horizontal and one vertical. The sudden drop in output from two detectors gives the computer the X and Y coordinates of your finger, so that it knows which element of the screen image you are selecting.

* * *

One of the handy things about personal computing is that any information stored in a computer — stock quotes, flight schedules, legal documents, encyclopedia articles, magazine and book texts — can be shared with other computers via electronic mail. Various handy things can be done with this function: from home you can tap into a data bank by phone and "download" the information you need into your computer, incorporate it into a report, transmit the revised version to someone else (or to a computerized typesetter for printing), print out the most useful parts of it on paper at home, have the computer generate a printout in Braille, feed the text to a speech synthesizer (so that a blind user can hear the information whenever he wants, without having to depend on a human reader), and so on.

Today most published information is computerized, and so is available in electronic form via data banks. But what of documents that exist only on paper? Must they be laboriously retyped to make them available to a computer? The alternative is to use an optical character reader (OCR) to scan each document and convert the text to computer code, but there are two obstacles: OCRs typically cost $10,000 or more, and most are designed to read only few special typefaces. The *Phoenix*, for instance, uses an OCR to transfer reporters' typewrittten stories into a computer for editing and typesetting, but this works only for stories that have been typed on modified IBM typewriters equipped with special OCR type elements and special platens that produce a different line spacing from that used normally.

You've heard about the prices of computer equipment dropping rapidly, but here's a dramatic example: a new optical character reader called the Oberon Omni-Reader costs only $500 and connects directly to most popular personal computers via an RS-232 serial port. The primary reason for its low price is that the scanning of the printed text isn't automatic; you move the scanning head across each line by hand.

The good news is that it really works. A friend of mine recently used it to enter a 29-page legal document into his portable computer; it was a lot easier than typing the whole thing would have been. The Oberon recognizes only four typefaces, but they are fairly common ones, and the company claims to be working on an improved version that will read lots of type styles. Under ideal conditions — crisp black print in one of the type fonts for which it was designed — the Oberon reader produces a virtually perfect translation of printed or typewritten text into ASCII code.

As the conditions become less ideal, with other typefaces, proportionally spaced book print, lousy second-generation photo copies, and so forth, the Omni-Reader starts making errors, but the printed material has to be pretty awful before the reader fails completely. If the print to be scanned is faded (typed with a worn ribbon, for instance), a dark Xerox copy yields a much lower error rate. Broken or incomplete text characters are misread almost all of the time, whereas the dirty gray background of a too-dark Xerox copy raises the error rate only slightly.

Of course, once you get the text into a computer, you can use any standard word processing program to edit it, fixing the reader's errors as you go along. This goes especially quickly if you use a spelling-checker (proofreader) program to scan the text and find the misread characters.

* * *

One of the attractions of the new IBM PC-AT (Advanced Technology) computer is that it is blazingly fast, much faster than the standard IBM Personal Computer (PC or XT). This difference in speed is not particularly important if you use your PC mostly with simple programs to do simple jobs, like using PFS:Write to type business letters. But if you are a so-called power user, who has added maximum memory expansion and a hard disk to his PC in order to run very complex programs with large volumes of data that stretch the machine's capabilities to the limit, then you may be among the big crowd of PC users wishing that they could afford to replace their PCs with PC-ATs.

The obstacles to doing this are the high cost of the AT, its limited availability (because current demand exceeds supply), the reliability problems that early AT users have experienced with its hard disk, and the AT's annoying incompatability with some PC programs. The last point is particularly ironic: only IBM could market an enhanced PC clone that isn't 100 percent compatible with the regular PC and get away with it.

An alternative solution is at hand. You can give your PC a heart transplant that will triple its effective speed when running complex programs and big volumes of data. The key is to replace the PC's 8088 microprocessor, which functions like an old 8-bit computer in all operations that require fetching program instructions or data from either memory or disk. The transplant doesn't require surgery; it comes in the form of a simple plug-in circuit board that goes into one of the PC's expansion slots. It's called the PCTurbo 186 board, from Orchid Technology (47790 Westinghouse Drive, Fremont, California 94539; the telephone number is (415) 490-8586). You can install it yourself or have your dealer do it.

The PCTurbo board contains a true 16-bit 80186 microprocessor. This is a more complex chip than the 8088, with much more efficient management of memory and disk operations, and with the added benefit that it responds to the same instructions as the 8088 and runs standard PC programs. When the board is plugged in, the 80186 takes over the running of programs and data while the old 8088 remains in place to handle the interface with the keyboard and screen. The PCTurbo board contains its own high-speed memory bank (from 128K to 640K bytes, depending on cost) for running programs. Meanwhile it uses your PC's own memory as a floating RAMdisk, automatically storing your most frequently used programs and data there for instant access, which further speeds operations by eliminating most pauses for disk reading.

The PCTurbo board costs around $1500 (give or take a few hundred dollars, depending on how much high-speed memory you buy with it). If that seems like a lot, think about how much more it would cost to buy a PC-AT.

Another advantage to the new PC-AT that makes it appealing to PC users it that its floppy-disk drive has a storage capacity of 1.2 megabytes per disk, nearly four times as much as the 360 kilobyte capacity of ordinary PC disks. This gap is bridged by a new product called "PC Your AT" from a company called Tall Tree Systems, located in Palo Alto, California; the phone number is (415) 964-1980. It consists of a new disk-controller card and one or two new half-height 1.2 MB AT-format disk drives that fit into the space presently occupied by one 360K drive in your IBM PC. The price is $400 with one drive, or $600 with two. With two 1.2 MB drives in one slot and the original 360K in the PC's other drive slot, you end up with a total on-line disk capacity of nearly three megabytes — without the cost and noise of a hard disk! Alternatively (for PC-XT hard-disk users), the high capacity of the new floppies simplifies the task of making safety backup copies of the data on the hard disk.

* * *

The Apple Macintosh has an extraordinary ease of use that makes it very appealing, but many potential business users have avoided it because of a perceived need for compatibility with the IBM PC in the corporate environment. That need no longer be an obstacle, thanks to a new product named MacCharlie. It's a slim box that attaches to the Mac, is designed to look as if it were part of the Mac, and contains the heart of an IBM PC (an 8088 processor, memory bank, and one or two IBM-format disk drives). It works through the Mac's screen and an expanded version of the Mac keyboard that is equipped with the function keys and numeric keypad that PC-compatible programs need, and it has serial ports for communicating with other PCs. When you run programs from MacCharlie's disk drive, the Mac becomes a PC clone. When you run programs from the Mac's own disk drive, it's still a Mac.

Two versions of MacCharlie are available. You can have one disk drive and 256K of memory for $1200, or two drives and 640K of RAM for $1900, a fair price for having the world's two most important personal computers in a single,compact unit.

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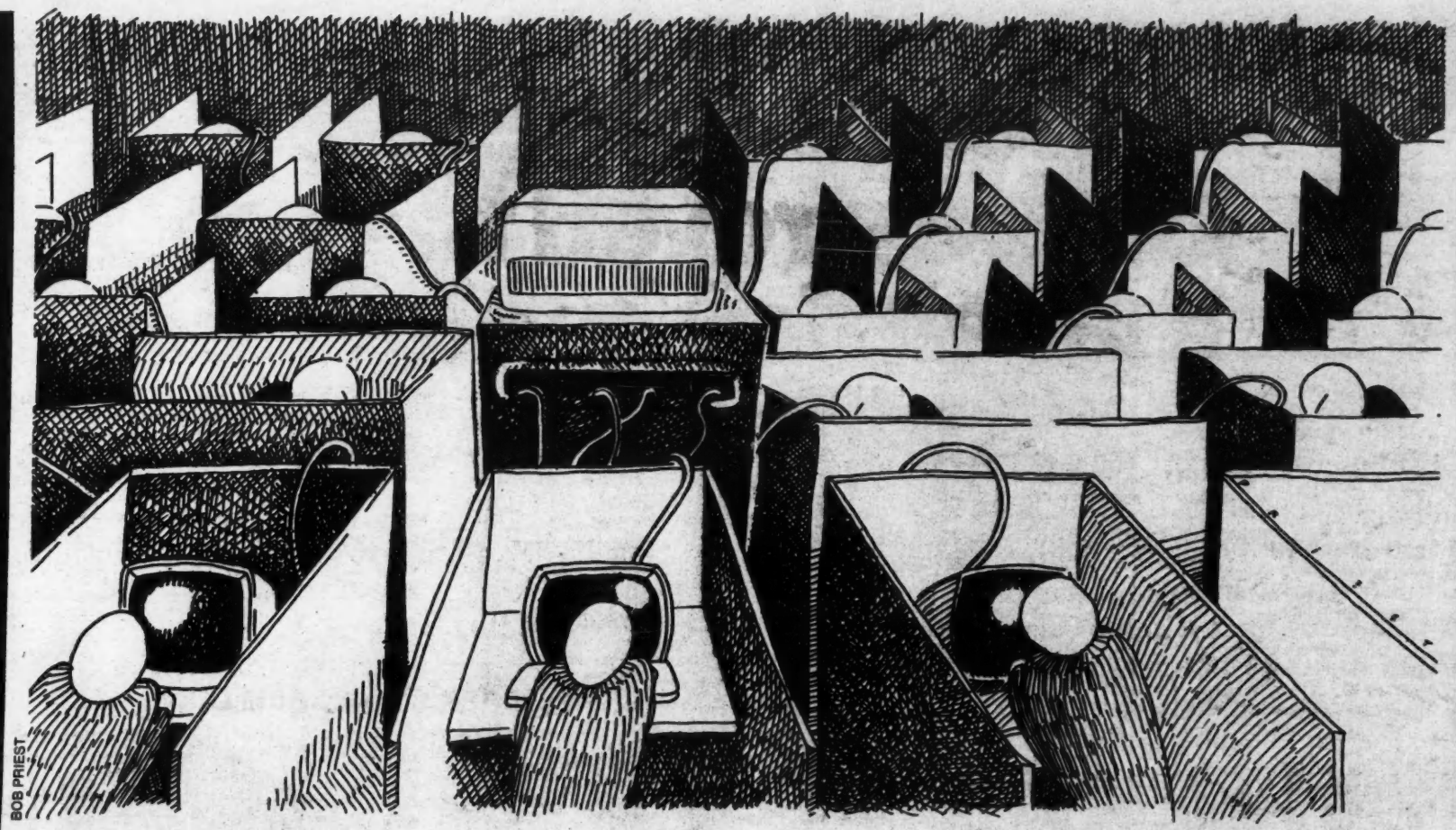

BOB PRIEST

The tie that binds

LAN brings personal computers together

by Sally Apgar

In August 1981 International Business Machines launched a full-scale invasion of the small microcomputer market with its newest and smallest weapon, the IBM Personal Computer. The big blue superpower of mini- and mainframe computers began pouring money and resources into the comparatively underdeveloped micromarket, effectively adding momentum to a revolution that would irreversibly change the everyday lives of those in the white-collar class. But those who believed in the PC revolution had no idea it had a fatal flaw that would eventually spawn the next revolution — that of the Local Area Network (LAN).

Meanwhile, not only businesses but individuals could finally afford computers. Middle managers in large corporations saw the PC as their escape from the petty tyrannies of the Data Processing (DP) Department for they could now replace their terminals with PC's equipped with enough processing power and storage to start minor desktop empires. But real change took place among those managers who had never touched a keyboard before. To them, the PC meant freedom and power.

For the first time, these initiates had access to huge stores of information via PC programs. Soon they recognized that the new machine could even improve the lives of their subordinates with easy-to-use word-processing and data-base programs. Yes, life was better under the PC. The workers were more productive. And so, PCs of all makes and models took over desks, departments, indeed whole buildings and businesses.

But slowly, the allure of the PC began to fade. Its fatal flaw — its isolation — became apparent. Workers and machines need to communicate, to share information and resources. According to IBM's studies, 90 percent of the information generated by a business is shared within its own walls, 75 percent of it within 600 feet of its origin. So, the solipsistic machines needed to be interconnected: information needed to be quickly and smoothly shuttled from desktop to desktop, and workers needed a way to reach into the corporate resources living off the mini- and mainframes under the control of the DP department.

To accomplish such interoffice communications, users turned to the new guidance system of the '80s: LAN. As a single communications network, LAN can interconnect hundreds of different devices with a high-speed communications link that's usually faster than 1Mbps. It can also interconnect existing systems within a business — such as multi-user systems (a host computer with terminals), burglar alarms, electric cash registers, and thermostat controls. While LAN itself is confined to a building, a group of buildings, or a campus, it can have "gateways" to wide-area networks across the street, say, or across the country.

But, as Robert Fleming of the Gartner Group, a computer market-analysis firm in Stamford, Connecticut, explains, "LANs aren't a grow-your-own-garden phenomenon like the self-contained PC; people are going to need the support of management information systems [data processing departments]." Ironically, the PC reliance on LAN has brought workers back to their one-time nemesis, the Data Processing Department.

Technically, the relationship is messy. Networking is more complicated than simply stringing everyone together with miles of magical cable. First, stubborn incompatibilities exist between machines and office systems that were never intended to communicate, not to mention the lack of coordination between the various PCs, the host computers with their attendant terminals, the high-tech printers, the plotters, and the hard disks with central-file storage.

Additionally, something has to power the data transfers, monitor transmissions for errors, and arbitrate who gets control of the network channel when and for how long. These responsibilities are usually shared by different LAN components. For example, there's at least one "file server" — a box (sometimes an actual computer like a PC XT) stuffed with storage for commonly shared data files and programs, along with microprocessors with the power to handle requests to access, alter, or transfer those files. There is also circuitry connecting each device to the network cable or channel. For example, in most PC LANs, an adapter card in one of the PC expansion slots manages the transmission and receipt of data thereby leaving the PC's 8088 free to single-mindedly handle requests from the user sitting at its keyboard. The processor on that card is often more powerful than the one in the PC itself.

Adding to the technical challenge, users may want to send more than simple digital computer data over the wire; they may, for instance, want to send voice and video as well. This means not only that the work stations have to support voice and video but also that the actual cabling that carries the signals must have a bandwidth ample enough to support the simultaneous transmission of voice, video, and data. A broadband system will support analog signals (voice and video) as well as digital ones — but at a price. Although this system has an adequate bandwidth, which is subdivided into channels defined by a specific frequency, each device on the network needs an RF modem between it and the network cable to translate incoming and outgoing information. Then, too, most buildings are wired with common telephone wire, a baseband medium that cannot support voice, video, and data, so a lot of businesses have to rewire entire buildings.

Technical obstacles aside, voice and video applications are only in the early stages of development. Present video applications in businesses tend to center around pedestrian functions such as security monitoring; voice applications are little more than glorified telephone-answering services. (Brown University, however, one of the first academic institutions to install a LAN, has begun to experiment with video lecturing.) Since businesses usually look at a LAN as a long-term investment, many want built-in voice and video capability to enable them to easily incorporate future applications into their system.

Obviously, the need is there, and where there's demand, there's usually supply — in this case mainly from IBM and AT&T. Since 1981 IBM has steadily been amassing a large market base of PCs, and, undoubtedly, many businesses will look to IBM for network guidance.

In 1986 IBM will introduce its token ring, which experts say will become the LAN standard in office environments. Already IBM has formed alliances with companies such as Rolm for communications expertise, Satellite Business Systems for long-range satellite transmissions, and Sytek for a stand-in PC LAN, connections the company will maintain until the token ring is ready for delivery.

To date, IBM has announced five different networking schemes — the Cabling System, PC Net for PCs, PC Cluster (which includes the PC Junior), a factory LAN, and, of course, the token ring. While this variety has confused many users, IBM claims that each scheme is suited to a particular environment and that eventually a common level will emerge at which all these different networks can interface into one neat networked system.

Like IBM, AT&T has a large established base — its telephone network. Although AT&T already has communications expertise, it too has allied itself with computer companies, including Convergent Technologies and Olivetti. Over the past 18 months AT&T Information Systems (AT&T-IS), the computer division of the phone company, has been steadily edging its way further into the office-automation scene. It has built a product line that includes a designer collection of voice/data work stations (with models designed for the specific needs of secretaries as opposed to top executives), its own LAN — the "Information Systems Network" — which can support a single department or an entire corporation, and enhanced versions of its PBX phone systems.

A field of 100 or so LAN vendors are fighting for ground. Some have spent the last seven years refining their products, but despite their efforts, they haven't seen masses of joyful users who are ready to offer up whole buildings and businesses to the new technology. In fact, so far they've attracted primarily the techno-wizards usually found in engineering firms, labs, academic institutions, or government agencies. These are the traditional risk-takers, those driven more by technolust than by financial profit who have the expertise to tinker with less-tried technologies and to write their own applications programs.

For the most part, investments in LANs have been conservative. Most of the market activity has been in made-for-PC LANs, which are usually bought by small- to medium-size businesses. Large corporations tend to confine LANs to isolated departments on a pilot-project basis. Generally, managers have been hesitant to invest in a LAN, afraid that it may turn out to be tomorrow's technotrash. After watching independent PC vendors be mowed down by others cloning their products, managers are reluctant to move before IBM does.

"Selling a LAN today is a real educational challenge," says Jim Jordan of Ungermann-Bass, a mainframe maker of a successful LAN. "IBM has a stifling effect on the marketplace. But their product is still a year away, and users are beginning to get tired of waiting."

By 1986, predicts the Gartner Group's Robert Fleming, "there's going to be a real shake-out in the marketplace, because IBM and AT&T are going to be in it in force. Even though the LAN market is growing very quickly, I just don't see the myriad of small vendors surviving. Especially as people begin to get interested in office-wide connectivity. It's going to be bloody."

Right now the LAN revolution resembles the early days of the PC revolution: no clear leaders, no absolute technologies, and no single shining standard have yet emerged. Instead, there is a wide field of vendors and LANs but little available made-for-LAN software. "It's just like the early days of personal computers, when they were built by the guys who built Heathkits,"

Continued on page 13

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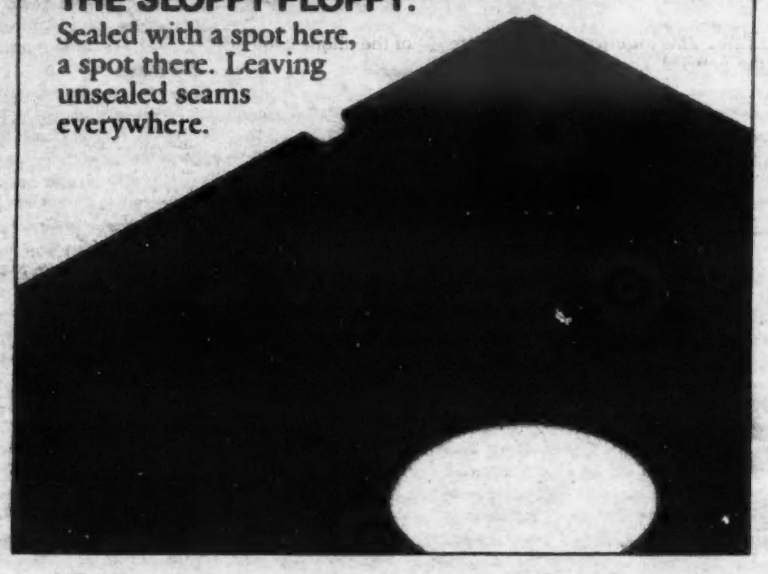

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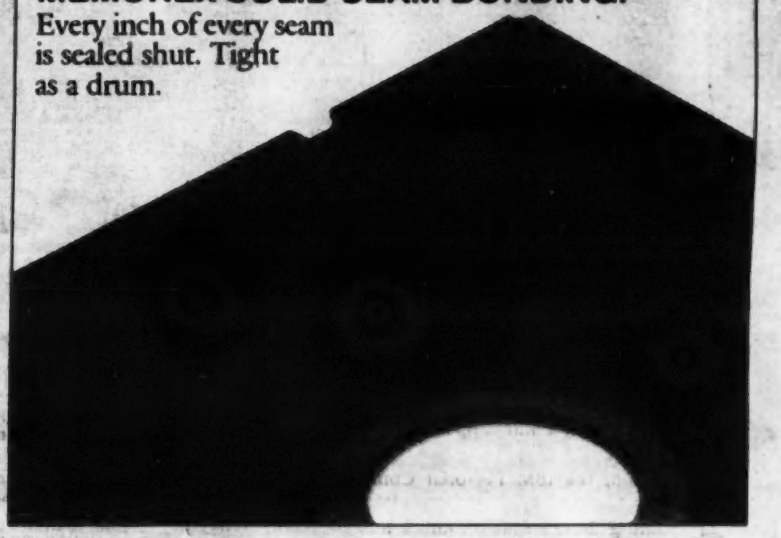

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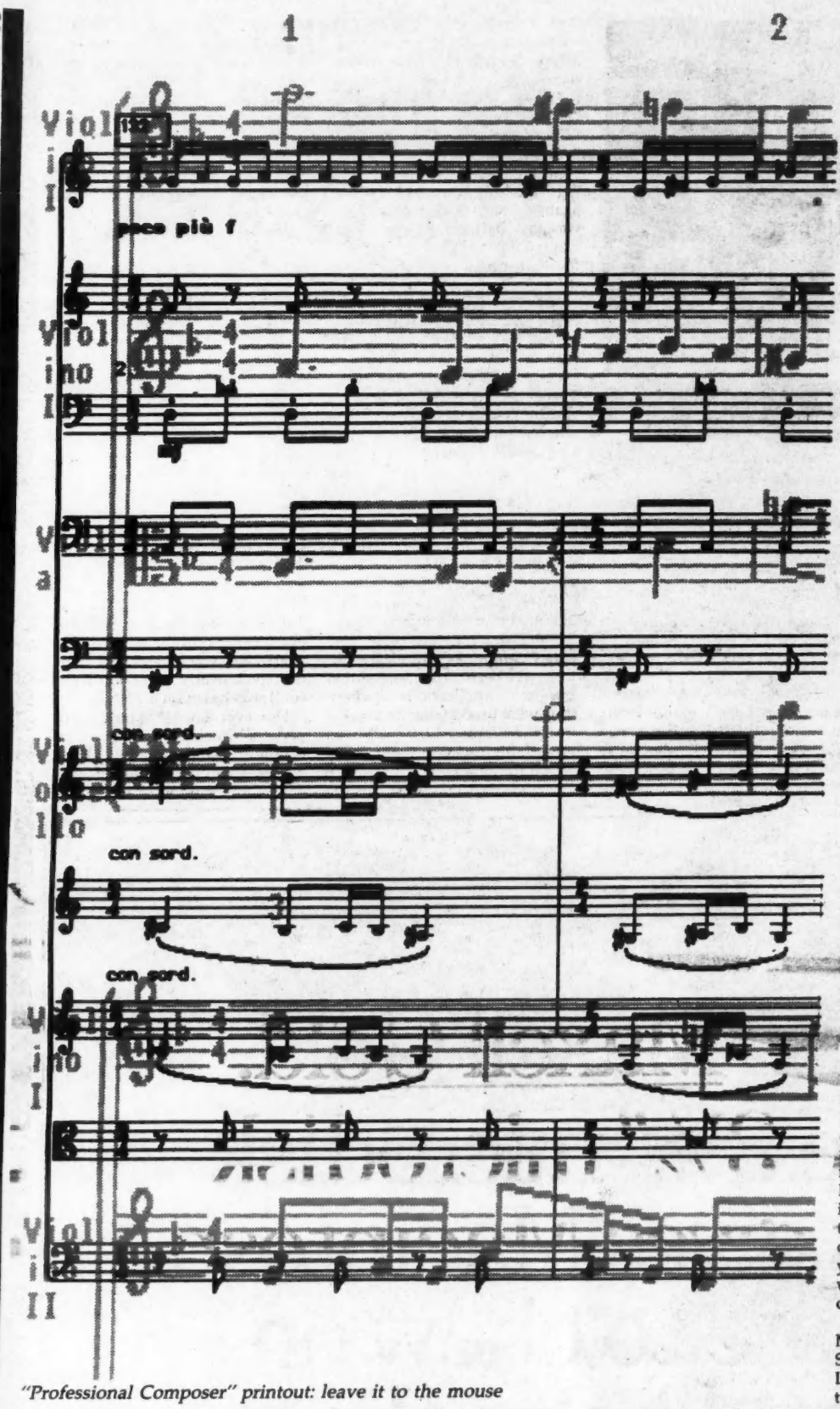

"Professional Composer" printout: leave it to the mouse

Ascending scales

Music-writing programs make it easier

by Andy Gaus

In last fall's *Phoenix* computer supplement (October 30), I howled in vain for a good little program to process written music — not as synthesized sound or as intervals subject to the rules of four-part harmony, but as notes straight from a composer's or an arranger's head. I woefully concluded that such a program was nowhere on the horizon.

Well, at last it is. At least one major new program for the purpose has been released, and two others are so close they've just about written their bar mitzvah speeches. Since I've seen the manual for one and a demonstration of another, I can now draw a few fuzzy conclusions about software available for the creative musician:

1) Most programs so far have been designed around instrumental input: what you play on your synthesizer comes up on the screen as written music. It may sound magical, but it never seems to work quite right. The notes and rests, for instance, are never the right length because you didn't play precisely enough. At least, *I* never play precisely enough.

2) Designers of music-writing software gravitate toward the Apple Macintosh. The Macintosh is a fast-responding machine overall, and it permits a unique kind of pictorial interaction — draw *this* and then pick it up and put it over *there*. But the Macintosh may prove inherently limited for use by composers or arrangers who just want to write music down as fast as it comes into their heads. The thing about the Macintosh is that you're kind of cornered by the mouse, a cursor-control unit moved manually on your desk top.

3) Whatever music program you're eyeing, something much better is always just about to come out. Let's start off by dismissing, for music-notation purposes, the widely advertised Music Processor Program for the Commodore 64 (Sight & Sound Music Software, Inc., 3200 South 166th Street, New Berlin, Wisconsin 53151; $34.95), which allows you to "write and record your own songs." In fact, Music Processor is potentially a good tool for teaching beginners the basics of notation. It allows them to hear a melody played while watching the corresponding notes appear on the screen in the same rhythm — a demo even the most experienced teachers couldn't match. It also allows them to record, say, "Yankee Doodle" by specifying the notes, one by one, in the form of a BASIC program: 30 D, 40 E, and so on.

Music Processor doesn't allow, though, for anything like full music notation on the screen, and it doesn't print music out in any form whatever. The program is analogous to a word-processing program that demonstrates the insert, delete, and block-move functions and leaves just enough space for you to compose a note to the milkman. In short, this one is for kids, and even they should be able to move quickly beyond it.

A more estimable entry is Professional Composer, for the Macintosh, from Mark of the Unicorn (222 Third Street, Cambridge, Mass. 02142; $495). This one does a lot. It allows you to write and print out professional-looking music and even play up to four voices through Macintosh speakers. Parts can be combined, separated, and transposed, which means, for instance, that you can prepare the conductor's score of a piece, along with the parts for individual musicians, while writing the music only once.

My first impression, from trying out Professional Composer at the Boston University Bookstore in Kenmore Square (you can do likewise), is that it is an extensive and full-featured means of working with music, but may not be very handy for speedy input. Two input modes are available. In one version, you use the mouse to pick up an eighth note, or whatever, from a palette of note values at the left of the screen and then set it down at the desired position on the staff. It's easy to understand, but laborious to do. How would you like to process words by using the mouse to pick up the letters, one by one, from an alphabet in the corner of the screen? The second mode, which uses the Macintosh's keyboard together with the mouse, could doubtless be made to go a lot faster; here, you use the mouse to set the cursor on the right pitch and you punch a key to set the rhythmic value.

Always the mouse. Because it's for the Macintosh, the program *has* to be designed around the mouse (there are no up, down, left, or right arrows), and the creature is hard to control when fine movements are required. In particular, I had a lot of trouble placing notes accurately on the correct line or space of the staff. No doubt a person becomes a more proficient mouser with practice, but there's no getting away from the fact that the mouse is like an agile arm ending in a hand with no fingers. So, Professional Composer could be invaluable if your chief desire is to edit music manuscripts or print out good-looking lead sheets of your songs. But I don't think I'd want to sit in front of it and compose music on the screen.

Another music program for the Macintosh, Musicworks (Hayden Software, 600 Suffolk Street, Lowell, MA 01854; $79.95), turned out to be a glorified version of the Commodore Music Processor Program. It records, plays back, and notates, but it's not fully set up for music notation (I couldn't get it to set any sharps or flats), so it's not the answer for professional purposes.

Two other music-notation programs for the Macintosh have been advertised, but too late for me to get my hands on them: Music Type (Shaherazam, Box 26731, Milwaukee, Wisconsin 53226; $49.95) and Music Character Set (South Bay Software, Box 969, Millbrae, California 94030; $24.95). And still another Macintosh program is currently being prepared: Total Music (Southworth Music Systems, Box 275, RD 1, Ann Lee Road, Harvard, Mass. 01451; $389). I recently saw a demonstration of some of Total Music's capabilities, but it wasn't clear whether the program will be any more *adequate* for speedy music transcription than the others.

Total Music's central purpose is to hook the Macintosh up with an MIDI synthesizer. MIDI (Musical Instrument Digital Interface) is an industry standard for digital synthesizers — keyboard synthesizers, guitar synthesizers, and drum machines — agreed upon by a consortium of Japanese and American manufacturers two years ago. Just as the existence of standard ASCII computer codes for letters and numbers allows different brands of computers to send each other text and information, MIDI allows keyboard, guitar, and drum synthesizers to record digitally together, and to be played back from one central controller. To accomplish this, MIDI reduces the different kinds of music to the same kind of numbers.

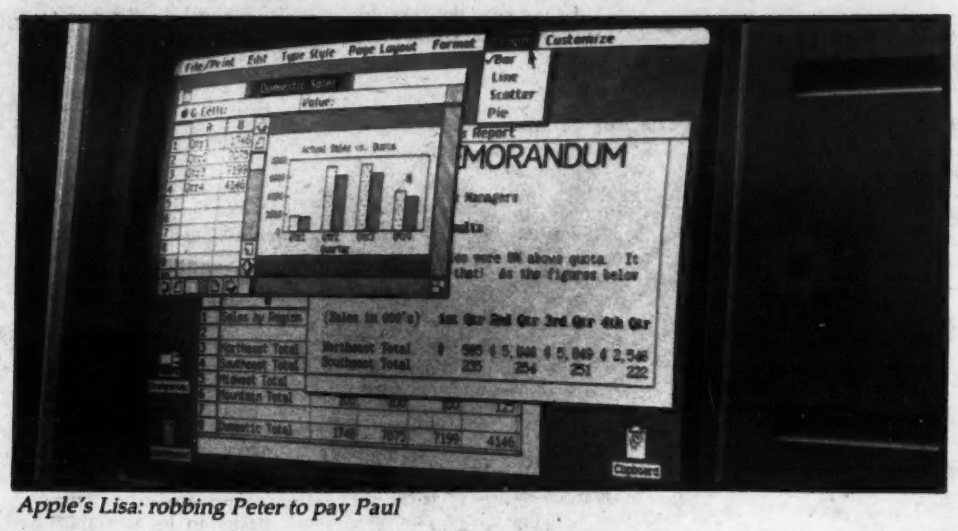
With the Macintosh and Total Music, you can lay up to 16 simultaneous tracks and edit the tracks on the screen as if they were text, changing tempo, key, wrong notes, or even the speed of attack. You can also manipulate whole blocks of music; that is, you can put together two verses, a bridge, and a closing verse of a song after playing a single verse and bridge. A second-generation feature of the program will allow those tracks to be coordinated with the soundtrack of a film automatically, so that once you specify that a certain segment of music is supposed to start on frame 470, say, the job is done. You never even have to go to the film studio.

As for writing the music down and printing it out, that part of Total Music wasn't ready to show. Presumably, you'll be able to write music on the screen directly or play it on a synthesizer keyboard and have the corresponding notes come up on the screen. You'll also be able to play pitches on the musical keyboard while specifying their time values with the mouse. As for my objection that the musical-keyboard input method never seems to produce on the screen anything approximating what you meant to write, Paul Lehrman, vice president of Southworth Music Systems, insists he has found a new and fascinating algorithm that will produce decent-looking, substantially correct music automatically, with the notes on the appropriate side of the stem, the stems turning the right way, and the sharps and flats correctly assigned. (G sharp and A flat may be the same note, but musicians definitely don't want unwarranted sharps in the middle of their flat keys, and vice versa.) Let's hope Lehrman's right: playing a piece of music is the fastest way to write it down — if it can really be made to work.

One more notation program is on the verge of release: THEME, for the Radio Shack III and IV (THEME Software Company, 301 W. Little Creek Rd., Norfolk, Virginia 23505; $600). THEME is strictly for writing, editing, and printing music, not for synthesizing, recording, or performing it. It was designed to serve the needs of music scholars and will be adapted to transcribe and edit music from the 12th through the 20th centuries. It's operated from the computer keyboard, which I suspect may allow for faster transcription than the other systems I've seen.

THEME isn't cheap, though. To set yourself up, you need the computer (about $1000), a Bausch & Lomb DMP-40 plotter (also about $1000), and the $600 program. For a system involving Total Music, you need a Macintosh, preferably 512K (about $2000), an Apple Imagewriter printer ($600), the $389 program, and a MIDI synthesizer (a Casio CZ 101 can be had for $500 or so). On the face of it, it would seem that $3500 to write music with what amounts to a recording studio in your home is a better value than the $2600 THEME costs just to write music, but of course that depends on what you want to do, how well the systems work, and what fits your particular style.

All in all, it's gratifying to see that music-writing programs are being developed, but the field is still open for a program that goes faster than Professional Composer and requires a less expensive set up than THEME. You programmers out there, take note. □



Apple's Lisa: robbing Peter to pay Paul

Circuit shorts

News from the world of computers

by Peter W. Mitchell

Junior Forever? Reports of the death of the IBM PC Junior are somewhat exaggerated. When IBM shut down production of the PCjr in April, there were reportedly about 100,000 Juniors already built and sitting in a warehouse. But since people have been buying only 20,000 per month, that's sufficient supply to meet the demand until sometime next fall. So Junior will continue to be available at least through the summer, perhaps at a bargain price.

Is IBM getting out of the home computer business? We really don't know. It may be that IBM hasn't decided yet. The lesson that IBM learned from the PCjr is not that the Junior was a failure, or that the home-computer market is dying (it isn't), but simply that, with a typical system price of $1600, the Junior was too expensive for the home market.

When IBM slashed the PCjr's price before Christmas, so that complete Juniors were selling for about $900 with a color monitor, the machine became an instant best seller. But at that price IBM was losing money — and to make things worse, IBM's advertising costs came to more than $1000 for every Junior sold. After Christmas the price of a Junior system went back up to the $1200 range, and sales dropped back to a slow 20,000 per month.

So the real question about IBM and the home computer market is, What will happen when the present inventory of Juniors has been sold off? My guess is that IBM will eventually introduce a new Junior — redesigned for lower manufacturing cost, so that it can be sold profitably at $900. Unlike the old Junior, which was built for IBM at a Teledyne factory in Tennessee, the new one probably will be built by IBM's Japanese subsidiary, which is already making a successful line of IBM computers for the domestic Japanese market.

• • •

Up Your Memory. The microcomputer world operates under a variant of Parkinson's Law: program sizes invariably increase to fill available memory. Back in the days when few computers contained more than 16 kilobytes of user memory, programmers created terse and efficient codes that worked efficiently within that space. As memory capacities grew to 64K, then to 256K, and now are typically half a megabyte, software companies have produced progressively fatter programs, which use up most of that space. There are already programs on the market that strain the capacity of a 512K Fat Macintosh and the 640K maximum memory of the IBM PC.

So what's next? Intel is developing a new memory board that will permit IBM PCs to work with as much as four megabytes of memory, and Apple is developing a Turbo Mac that will contain two megabytes of RAM, as well as the new Motorola 68020 central processor, a faster and more powerful version of the 68000 chip in the Macintosh.

• • •

LCD Breakthrough. Portable computers are wonderfully handy, but they all suffer from a near-fatal drawback: the lousy readability of their LCD screens. Many of the allegedly improved 1985 models, with bigger LCD screens, are even worse than before, because of a basic obstacle in LCD technology: the larger the screen, the lower the contrast. On a wristwatch with a one-inch LCD screen, the characters may be crisp and black, but on an eight-inch computer display, you get medium-gray characters against a slightly lighter yellowish-gray background, and the display disappears completely if the light doesn't strike it at just the right angle.

Now for the good news: the first really wonderful LCD display in a computer, with guaranteed easy-to-read visibility at all times (even in the dark), is available now in the $2000 Morrow Pivot computer, an IBM clone. This breakthrough has been made possible through the use of an internal fluorescent light, which back-lights the display. The new LCD display will also be marketed later this year in an IBM-compatible Zenith portable computer.

• • •

Sixes and Eights. Here's a curious bit of of computer trivia. Throughout the history of personal computers, the machines that have been most successful in business applications (where they were used mainly to process text and numbers) have all been based on microprocessors in which the first digit in the chip's designation is an "eight" — the 8080 and Z80 chips in Radio Shack TRS-80s and in the dozens of brands of CP/M machines, the 8088 chip in all IBM PCs and compatibles, the 80286 in the advanced IBM PC-AT, and so forth.

Meanwhile, most of the computers designed mainly for home use, and whose appeal depends on elaborate or colorful video displays, have been based on microprocessors whose number begins with "six" — the 6502 used in the Apple II series and in the Commodore and Atari home computers, the 6509 in Radio Shack's Color Computer, and the powerful 68000 that is used in the Atari "Jackintosh" and Commodore/Amiga color computer, as well as in the Apple Macintosh.

Was this division premeditated? Apparently not. When Steve Wozniak designed the original Apple computer, he chose the 6502 simply because it was cheaper than the alternatives — $20, compared to nearly $100 for the Z80. Besides, the dichotomy breaks down when you recall that the most popular of all video processors, the basic Atari 2600 video game machine (of which nearly 20 million were sold) was based on a Z80.

However, since IBM now owns part of Intel and is sure to continue using primarily Intel processors in its computers, and

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Circle 14

Shorts

Continued from page 11

since Intel processors always have numbers beginning with eight, the preponderance of the eights in business computing seems likely to continue.

* * *

Enhanced Apples. Since Apple launched the IIc a year ago, one of the continuing annoyances for both software producers and Apple owners has been that the IIc and IIe were not totally compatible. Programs written for the IIc might not run on the IIe, and vice versa. Now that's changing: Apple is redesigning the IIe to employ the same chips as the IIc, which will make the two machines almost completely compatible and will provide the IIe with some new capabilities in the process. The enhancement involves two chips: the central processor, now a 65C02 (an improved 6502 that uses less power, runs cooler, and processes data more efficiently), and a new ROM chip containing programming that will allow simplified Macintosh-like operation of the IIc and IIe.

One immediate result of the change is that SuperCalc 3, an enormously powerful spreadsheet/database program that competes with Lotus 1-2-3 (and is better than the Lotus in some ways), is now available in a version for the IIe.

What is the best-selling computer program on the market? The obvious answer is Lotus 1-2-3, but new data suggest that there will soon be a differnet answer: "Appleworks," a wonderfully easy-to-use integrated program for the Apple IIc and IIe. It's a $250 package of three programs in one: word processing, spreadsheet calculation, and information filing/sorting/retrieval. At an effective cost of about $80 each, the three programs are a bargain, and there's a hidden bonus: the package has a unique and extremely handy ability to keep several text/data files in memory simultaneously, allowing you to switch among them almost instantly. The Apple Macintosh, by contrast, performs the same function painfully slowly. When you want to change from one program or data file to another, you can go out and jog around the block while the Mac is loading from its disk drive. (On second thought, that may be a good thing, considering how many medical problems are caused by sitting in front of a computer for hours at a stretch — backaches, eyestrain, poor circulation in the legs, and the like.)

Anyway, a cure for slow Mac operation is available, and a second on the way. The $29 Mac Memory Disk (from Assimilation, Inc.) lets you use part of the memory of a 512K Mac as a RAMdisk, storing programs and data in memory where you can get at them rapidly. And Apple is developing a handy little Mac utility called the Switcher, which will let you keep either two large programs or four smaller ones in memory, switching instantaneously among them.

* * *

Cost vs. Profit. When you buy a computer, what are you actually paying for? A recently published analysis by Future Computing Inc. provides some interesting answers. The following list of major personal computers shows what percentage of their suggested retail ("list") price is accounted for just by the cost of their semiconductors — the microprocessor, memory chips, and so forth:

Atari 800XL	40
Commodore 64	26
IBM PC Junior	16
Compaq Portable	11
Apple IIc	11
IBM PC	10
Apple IIe	8
Apple Macintosh	6

Evidently, the low-cost home computers such as the Atari and the Commodore provide the most computing bang for the buck, But to a substantial extent that's because of their modular form: the list price includes only the computer circuitry and the keyboard, and essentials such as the video screen and disk drive are sold as "optional extras." In the Macintosh those features are built in.

A more telling comparison (see table below) would be to look at the computers' list prices against the basic factory cost of the materials from which they are assembled. If, for example, a computer manufacturer pays $1000 for parts for each unit it produces and gives each unit a list price of $1500, the list price is one and a half times (1.5) the cost of the parts.

Atari 800XL	1.5
Commodore 64	2.1
IBM PC Junior	2.8
Compaq Portable	2.8
IBM PC	3.8
Apple IIc	4.2
Apple Macintosh	5.2
Apple IIe	6.6

Conclusion: the price you pay for an Atari or Commodore is only a little more than its actual manufacturing cost; neither the company nor the dealer is making much profit. But when you buy an Apple, the manufacturing cost of the computer represents only a small part of the price you pay.

These figures are based on list prices, which include a hefty dealer markup — a large enough margin that dealers can sell Apples at 20 percent below list and still make a comfortable profit. Even if we apply a 25 percent discount to the above figures, the ratio of cost for the Apple IIe is still about 5.0. Putting actual figures on this, the IIe costs only $200 to make but sells for nearly $1000. If Apples were made and sold the way Commodores are, you could buy a IIe for $400.

How does Apple get away with such a large disparity? Here's how:

(1) A tightly regulated dealer network. Apples are not available from K-Mart or Zayre, or from most mail-order discounters. If a franchised Apple dealer slashes his prices too far, he not only cuts into his profits but also starts finding it difficult to get more computers from Apple; and without a popular product to sell, the dealer is out of business.

(2) An enforced monopoly. Programs written for the IBM Personal Computer can be used with dozens of compatible "clone" computers, some of which are much cheaper than the IBM, but Apple-compatible programs can be used only with an Apple. Using lawsuits and other tactics, Apple has killed off all Apple-compatible competition, effectively guaranteeing a monopoly for itself. So if you want to use all those nice Apple-compatible programs, your choices are limited: you pay Apple's price, or you try to smuggle in a $200 Apple clone from Hong Kong.

Why doesn't Apple lower its own prices? The company deliberately decided long ago to overcharge for the popular IIe and use the excess profits to underwrite the development of the Lisa/Macintosh series of high-performance products for the business market. So if you've just paid $1000 for an Apple IIe, you can take comfort in the thought that you have contributed to progress by subsidizing Apple's newest and most powerful products. □

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Zoom

Continued from page 3

in any format (such as text, program, or binary), and has a number of very sophisticated error-checking methods. It also has a comfortably large text buffer with an easy-to-use editor and a printer control that allows the user to print text without stopping the reception of data. The software is compatible with Apple's new ProDos operating system, as well as with the old standard DOS 3.3. In addition, it has what Manning calls "hacker's bells and whistles," such as a character-translation table, which allows the user to take any character in a file and send it out over the phone line as a different character, a necessary feature for communicating, between, say, word processors that use different characater sets.

Now that the company is firmly established in the modem market, it is ready to get involved with computers other than the Apple II. It is also ready to start playing in the big leagues: its next line will consist of modems that can operate at 1200 baud. The first of these will be a plug-in model for the IBM PC, which will be out in early summer. Zoom is not writing its own software for this model; the company is now in the advantageous position of being able to choose among outside suppliers.

Following the IBM modem will be a freestanding 1200-baud model, designed for any computer with an RS-232 serial interface. It is slated for release in late

summer, and though he is reluctant to reveal a precise figure, Manning claims it will be priced "better than the Hayes, and with more performance." "The market is going to get pretty cutthroat," notes Peter Kramer. "We don't want to have the cheapest modem available, but we want to offer the best value."

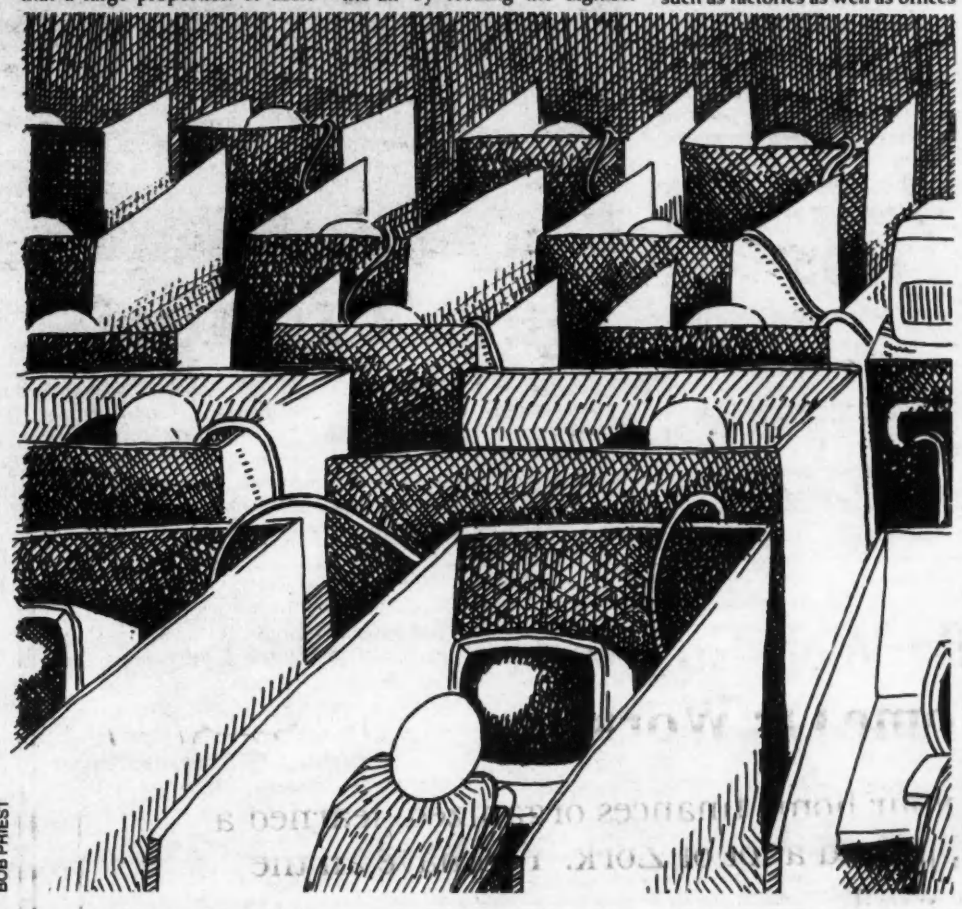
The modem will have open architecture, so that changes in the memory and the internal machine code can be made in as short a time as it takes to plug in an EPROM chip. "When someone comes along and says, 'I'd buy a thousand of these things if it would just do this other thing,' if you're using burned-in code, you have to wait about six months to make the change," says Manning. There will be a socket not only for a program chip but also for a touch-tone detector chip that will allow remote control, for extra RAM, and for a real-time clock, which will cost about half as much as the freestanding clocks that are currently on the market. And a Demon Dialer will be built in.

"We've paid attention to the office interface," says Manning. "It will turn on key-system lights, for example. We also have our tech-support staff right here, so we can give installation advice." Adds Kramer, "It will be easy to use just as it is, but we're also giving it enough hooks and channels that the real world can apply it to whatever it needs. We can't take care of all possible applications ourselves, so we provide enough inlets and outlets so people can design their own."

Further down the road is another product that combines computers and telephones in a different way. The Zoom/Voice PC, due out by the end of the year, will turn an IBM PC into, as Manning describes it, "an answering machine plus," for small- and medium-sized offices. Running with a 10-megabyte hard disk, the multi-user "voice mail" system will record spoken messages for individual employees in their own "mailboxes." Each message will be date- and time-stamped with a synthetic voice, and incoming callers will be prompted to hit one of the buttons on their own phones to get their message into the proper mailbox. There will be access codes to permit users to pick up their messages when they're away from the office, call-forwarding capability, and even a paging capability, so that when a call comes in for an individual user, the system can notify the person by dialing his or her pager, making it unnecessary for the user to check in periodically for messages.

The system can record up to an hour of messages on the 10-MB disk, with fidelity superior to that of the phone line itself. A "silence compression" feature prevents the disk from being loaded up with empty space. Best of all, the system is unique for its "background-tasking": the computer can be used for other jobs while the system is operating, thereby saving the company the expense of a dedicated machine. Like its other telephone products, Zoom plans to offer the system both through computer dealers as a stand-alone product and through office-system companies as part of their packages. The Zoom/Voice PC will not be the first voice-mail system on the market, but it should be the cheapest, thus allowing far more offices to take advantage of the technology. According to Peter Kramer, dedicated voice-mail systems now available for small offices cost anywhere from $1200 to $15,000 — Zoom's price is not yet fixed, but Manning says that it will "certainly be under $500" for the telephone interface and software.

Zoom Telephonics is very optimistic about its future. Its office systems will certainly serve the company well; moreover, Frank Manning and Peter Kramer see telecomputing as a revolution that has not yet begun. "Electronic banking hasn't hit yet in Boston, but it's very big in New York," says Manning. "It's because there are so many people that the banks have to deal with. You see all the major ones slugging it out with ads in the *Times*. We expect to work something out in that direction soon." As another sign of major interest in the field, he points to the recent joint venture between CBS, IBM, and Sears to provide a videotext service. He also notes that a large proportion of users have modems at home so they can communicate with the computer at their office — a practice Manning feels will continue to grow.



BOB PRIEST

Electronic shopping is another advance Peter Kramer looks forward to. "Not the kind of thing you see now but letting the computer do what it's good at: information processing, with sort of a *Consumer Reports* kind of approach. You call up looking for stereo equipment, and you want to know what's available and what the various magazines have to say about it and which dealers have the best prices. All of that information is already in a computer somewhere, so the hard part, the expensive part, has already been done. Now you just have to get it all together. The computer gathers it up and then leaves the information you want in your mailbox." He also looks at the possibility of low-cost personal "ZAP Mail," in which a facsimile of a document or a drawing is telephoned from one location to another. "It's not up yet," he says, "but it can certainly be done." □

Peripheral

Continued from page 7

One of the most appealing features of the Macintosh is its MacPaint program for creating and manipulating graphic images. People with drawing skill will use it to create images of their own, but for most of us the ease with which existing images can be edited, enlarged, shrunk, stretched, kaleidoscoped, and labeled is the great virtue of this system. But first, of course, you need some images to work with. There are disks of "clip art" with commonly used images available for sale, but a new device offers a remarkable possibility. It's a video digitizer that can capture any TV image and digitize it, point by point, into the same code that the Mac uses to represent its images, so that you can then use the MacPaint programs to alter the recorded TV images, select useful parts of it, and so on.

The digitizer can be connected to a video camera, so that you can create the scenes that you want to capture, or the digitizer can get its image directly from the video line output of a video-disc player or video-cassette recorder. Or you can freeze broadcast pictures off-the-air by feeding the digitizer from a TV tuner or the recording jack of a TV monitor/receiver. And once you've captured the image in one Mac, it can be recorded on floppy disk or can be transmitted to other Mac computers through a modem and telephone line.

This neat device costs about $600 and was developed by I/O Video, at 222 Third Street in Cambridge. □

LAN

Continued from page 8

explains Fleming. "There were no high-level programming languages or applications software available that these guys didn't write themselves."

With no software to show, vendors talk hardware, tough technogarble about speed and performance, about how they can outrun, outgun, outperform the competition. But systems are bought for what they can do, not for the intricacies of how they do it. Today, the value of a machine is measured by the volume of software it runs, not by the clock speed of its processors. Like the PC before it, the LAN is worth only as much as what it can do — what devices it can hook up to and communicate with, what applications programs it runs, what services it provides.

Over the next six months, as industry-accepted hardware standards reach completion, made-for-LAN applications software is expected to hit the market. And whoever sets the standard holds the key to success.

It's expected that IBM's token ring will set the de facto standard. It's also expected that IBM will again be unmercifully dominant in the marketplace. As in the PC revolution, IBM will allow the smaller independent vendors to battle it out for a time, exhausting their resources in battles over technical issues. But when the time is right, IBM will seize control, squashing small independent LAN vendors as it did the PC makers before them. IBM will establish its own standards, and third-party software developers will crank out software for the company. The takeover is only a matter of time.

* * *

While everyone is waiting for the unveiling of IBM's token ring, IBM is working on a grander scheme. It plans to make LANs for different environments — such as factories as well as offices — but the common interface for all these LANs will be IBM's own Net BIOS and Microsoft's MS-Net. If IBM has its way, Net BIOS and MS-Net will set the LAN standards, just as the PC (copyrighted ROM Bios) and PC-DOS set the personal-computer standard.

"IBM is going to make BIOS a standard interface for all of their networking products," says Ed Cooper of Sytek, which has been supplying IBM with a stand-in LAN while the token ring is being finished. "Everything will reside in the Net BIOS level for all IBM products. So from a networking point of view, they have established a common interface system. For the first time third-party software people will have a stationary target for IBM's entire networking strategy. Software written today, say, for PC Net will be compatible to the [token] ring and factory LAN."

IBM isn't wasting any time. Already it has been instructing software developers on the subtleties of networks based on Net BIOS and MS-Net so the LAN hardware and the applications software will be ready simultaneously. And with everything based on that standard interface, any applications software that runs on PC Net, PC LANs, or IBM token rings will also run on other LANs based on that standard.

If there is a common interface, that is, if there is a common cable-level language, then theoretically Wangs and WangNets, DECs and DECnets, and a wide variety of devices and applications could be attached to IBM networks. As a result, third-party software people who write for DEC will basically be writing the same program, with the same common interface, that they'd be writing were they creating programs for an IBM or a Wang system.

IBM's token ring has the endorsement of the International Standards Organization (ISO), which is trying to establish models for universally accepted communications standards. The ISO's 802.5 Committee, which focuses on LAN in an office environment, has recommended a 4Mpbs token ring system, which uses a twisted pair in a star-wired topology. The system is based on IBM's work.

At present, according to Fleming, the LAN battlefield can be divided into three war zones: the work group, the office (or entire-building), and the factory fronts. The work group uses specialized networks for engineering and scientific applications, as well as made-for-PC networks. Eventually, these work-group networks will be bridged together into a unified officewide system.

Fleming has also divided the armies into the systems vendors, the minicomputer vendors, and the independent LAN vendors. The systems vendors, IBM and AT&T, will control the officewide field with a large-scale total-building solution. As rich superpowers they can supply end-to-end data communications from the desktop-to-desktop level up to the satellite-to-satellite and microwave-communications levels.

Next, the minicomputer vendors — DEC, DG, HP, Wang — will battle for the work group. In particular, they will dominate scientific and engineering groups, specialized areas in which they have already established a firm footing. These minicomputer vendors have conceded that the days of proprietary privilege are over and that standardization is the norm. In 1978 DEC, along with Xerox and Intel, began working with the ISO to establish standards for LANs in scientific-applications environments, as well as in offices in which traffic is "bursty" — in which messages are infrequent but very lengthy. The result was *Ethernet*, a set of very specific guidelines for a broadband coaxial LAN with a bus topology, and a CSMA/CD access protocol with a transmission rate of 10Mbps. *Ethernet* has gained wide acceptance: vendors have seen the advantage of offering a standardized LAN product that allows them to network equipment from a wide variety of other vendors.

Finally, the independent LAN vendors are split between the PC-specific work group and the office wide front.

"And there is certainly going to be a shake-out in the PC-network area," says Terry of the Yankee Group, "There are just too many people with too many oddball networks out there. The fact of the matter is that the physical network components — the actual [network connection] cards — are settling down to become a stamp-it-out kind of thing. It's just like PC's; it'll all settle down."

"Today PC LANS are a major, major share of the LAN business," says Fleming. "But over the next two years, the focus of user organizations is going to change from simply looking at little groups and supporting personal computers to actually trying to come up with a strategic plan to wire entire offices (and buildings). And in order to make that migration there's going to be a real change in who wins and who loses."

In short, compared with the scale of the impending LAN revolution, the PC revolution may end up looking like a National Guard training exercise. The LAN stakes are higher: bigger investments and broader technical issues are involved; more users and more vendors will be affected; an incompatible range of equipment and an incomprehensible array of wiring schemes exist. The superpowers admit they can't control the whole thing, but they'll certainly be in opposite camps fighting the same war. □

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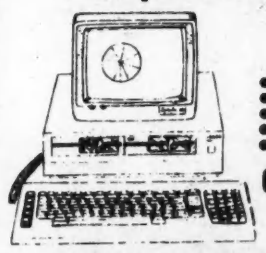

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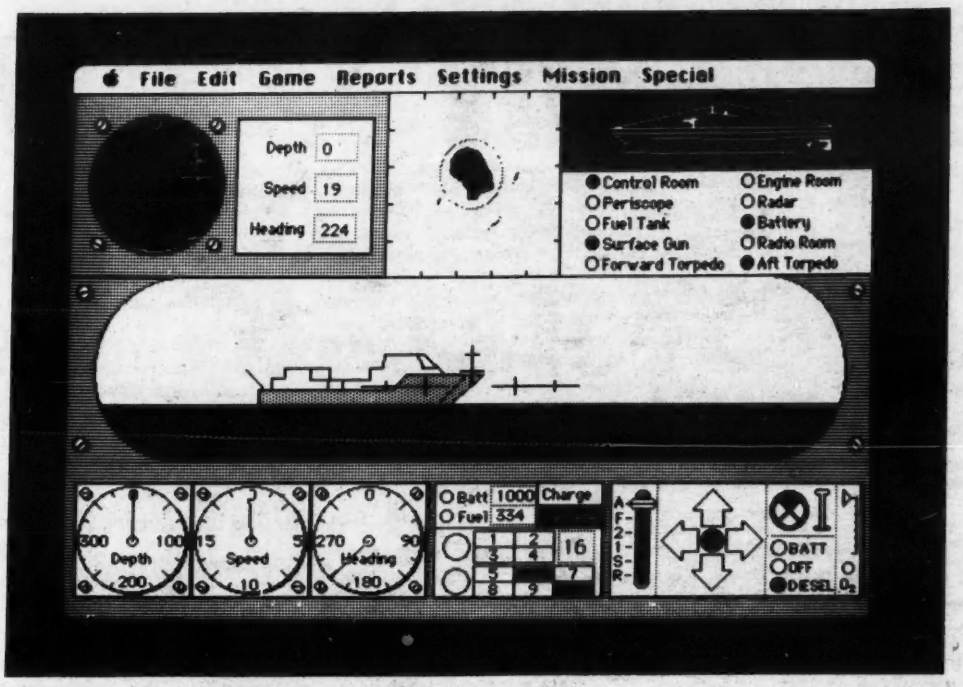

New Products

Submarine game

Spectrum HoloByte, of Boulder, Colorado, has introduced a version of Gato — a three-dimensional, real-time, submarine simulation game — for the Macintosh and Apple IIE and IIC. (A version of Gato for the IBM PC has already been introduced.) Players guide a World War II, "Gato"-class submarine through wartime missions in the Pacific. The screen displays the sub's controls, radar, and damage reports. On the periscope, approaching objects change size and perspective. Players control the sub's speed, heading, depth, type of power, periscope, radar, torpedoes, and oxygen supply — but not enemy ships, which are programmed to think strategically. The Macintosh version, taking advantage of the machine's extended graphics capabilities, shows everything on one screen. Also featured in the Macintosh program are more rapid submarine deployment and a Morse-code tutorial. Dive in.

Artificial intelligence game

Brainpower Inc., of California, now offers Chipwits, an introduction to the concepts of artificial intelligence in the form of a robot simulation for the Macintosh and Apple II series computers. Users impute or "program" a variety of human behaviors and reactions into robot. Given such skills as finely illustrated chip then controls a robot. Given skills such as finding and walking through doors, feeling for objects, and attacking enemies, up to 16 robot heroes then make perilous journeys to test their programming. Chipwits is designed to develop a user's reasoning, memory, and problem-solving abilities. The user can program more than one million possible behavioral combinations into each robot. Either/or situations are easily built into the robots — laying the groundwork for learning programming logic. A 100-page manual is provided with the program. The Macintosh version is priced at $49.95; the Apple II version costs $39.95.

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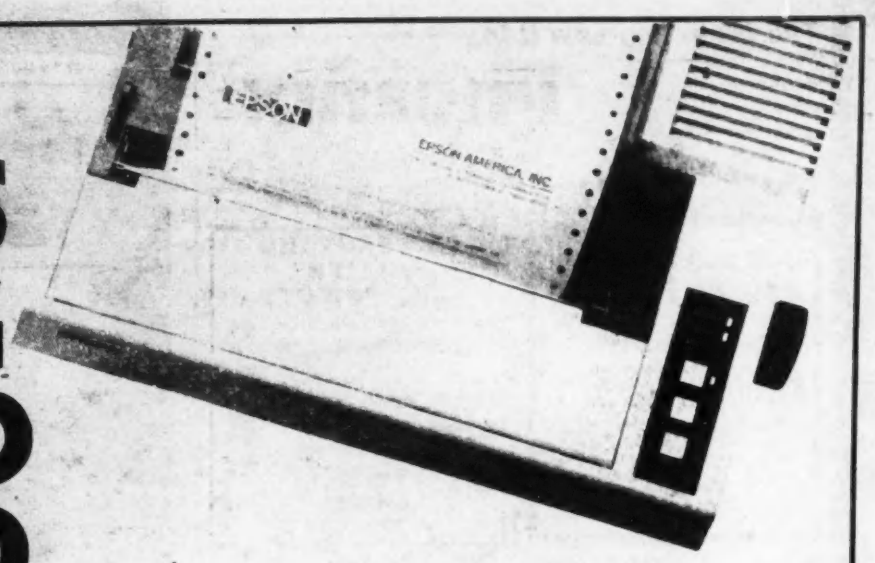

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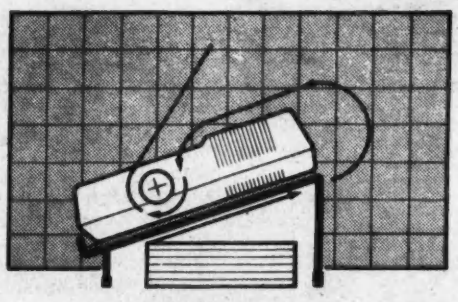

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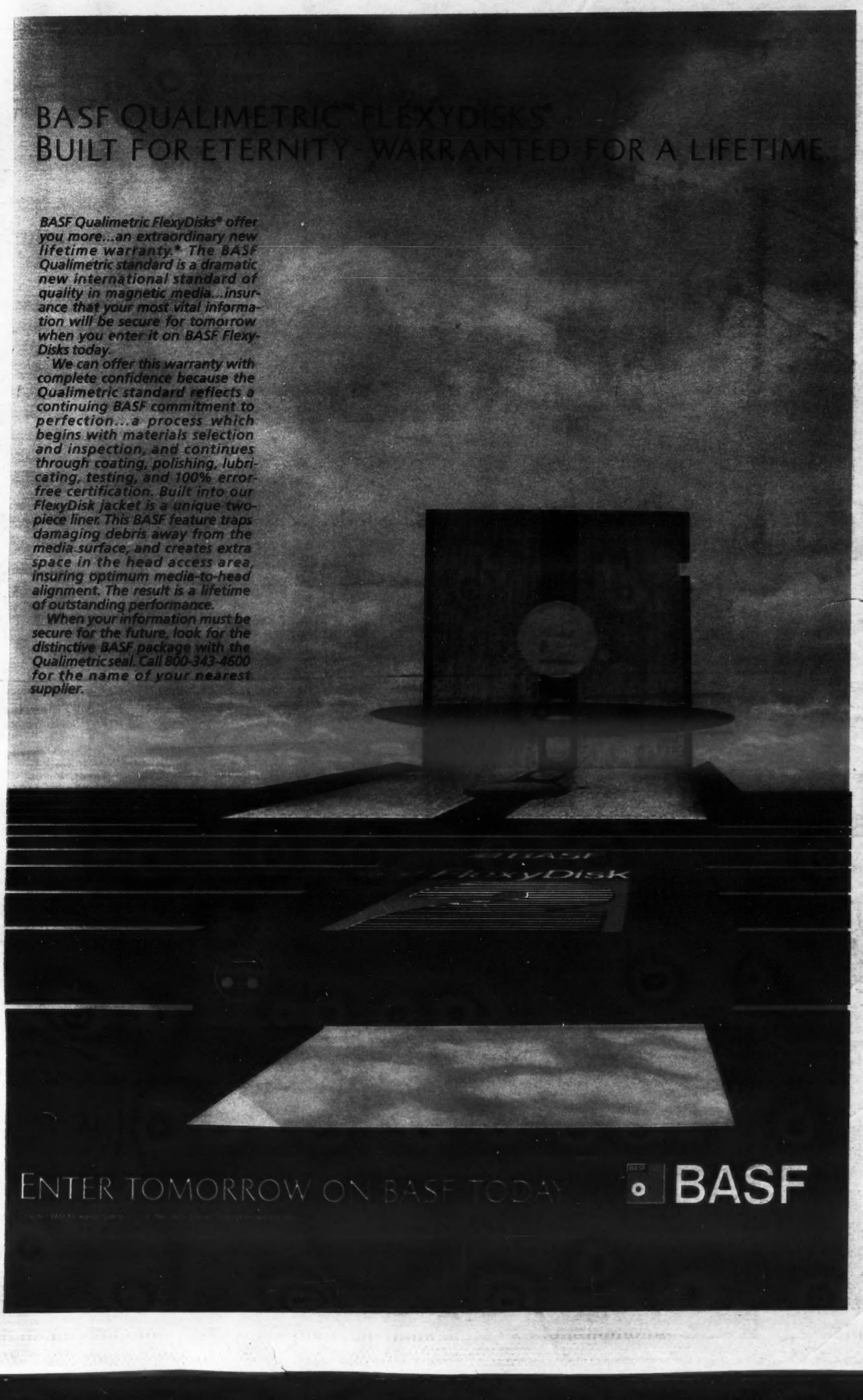

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NOMAD'S LAND

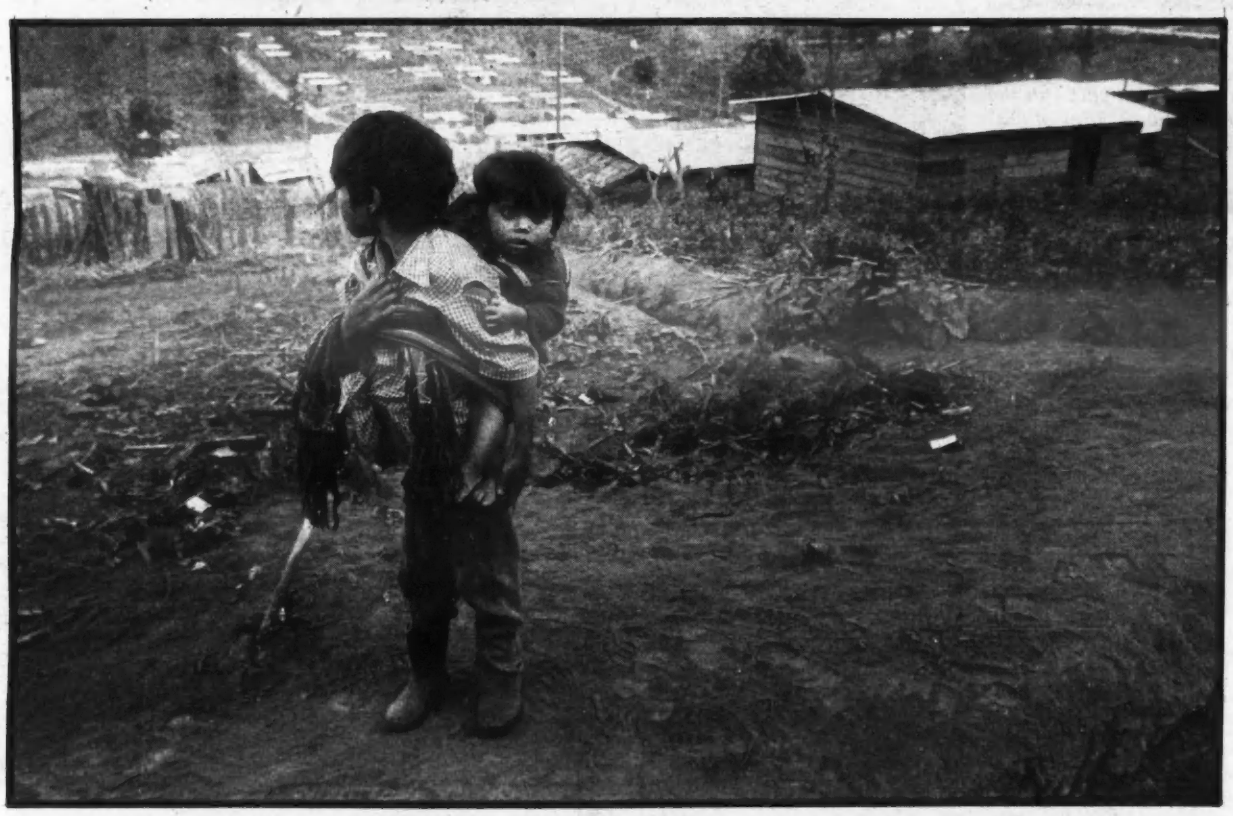
Guatemala under siege

Photos and text by Jerry Berndt

Chris Hedges, Central American reporter for the *Dallas Morning News* and National Public Radio, was assigned by his editor to do an eight-part series on the state of Guatemala under General Oscar Mejía Victores: the upcoming elections, the Guatemalan army's counterinsurgency campaign, the government's model villages and civilian patrols. Did I want to go with him? At the time, I knew almost nothing about Guatemala, but decided to accept the offer. As we crossed over the border from El Salvador, I brushed up on my background reading.

Guatemala: a country the size of Ohio (about 42,000 square miles) with a population of about seven million, half of whom are of Mayan Indian descent; the people are grouped into six major linguistic affiliations comprising 23 different dialects . . . *Guatemala*: where at least 86,000 people have been killed since 1954, when the US overthrew the democratic government of Jacobo Arbenz in a CIA-directed military operation called "Operation Success" . . . *Guatemala*: where poverty condemns to death up to 100 infants per 1000 live births; where some 25,000 people die each year from nutrition-related diseases; where Indian peasants have an average life expectancy of only 49 years . . . *Guatemala*: where at least 150,000 people have fled the country for Mexico to escape the army's massacre of thousands in its attempt to control guerrilla activity . . . *Guatemala*: where the Carter administration cut off military aid in 1977 because of gross human-rights violations . . . *Guatemala*: where 100,000 children are said to have lost one or both parents to political violence.

The photographs that follow were shot during a 12-day visit to Guatemala, from March 4 through March 16, 1985.



As part of its counterinsurgency campaign against guerrillas, the Guatemalan army has interned about 100,000 Indians into 70 "model villages." In the model village of Las Violetas, near the town of Nebaj, one man described how over the past several years the army had burned three of his houses to the ground and repeatedly cut down his crops with machetes. "Six days ago the army came and removed my family from the mountains in a helicopter," he said. "They told us it was better to live in this town."

Another aspect of the army's campaign against the guerrillas has been the formation of civilian patrols. Nine hundred thousand men have been organized into these unpaid patrols; they are responsible not only for keeping watch around their villages but also for carrying out army orders, which may include the killing of civilians. The patrol pictured here was stationed outside the town of Nebaj. Once every two weeks the men are required to patrol for 24 hours. These men had been out all night and were just eating their breakfast when we came upon them on the road to Nebaj. We asked what would happen if they refused to participate in patrolling. One man said that if they missed a patrol they would be put in jail for a day or two and that if they missed a second one, or if they refused to participate, the army would kill them.

Grupo de Apolyo Mutuo, *the "group of mutual support" for the Appearance Alive of Our Relatives, was started about a year ago by six people who were searching for relatives who had "disappeared." The group grew to include close to 1000 people. But two days before this demonstration, which took place on March 15 in Guatemala City, General Oscar Mejia Victores asserted that the group was "funded by extremist elements," and the minister of interior charged that it had been infiltrated by subversives. The members at this demonstration feared for their lives, because such allegations mean it's open season on group members by right-wing death squads. Today only two of the six founding members are still in the group. Two have been killed, one is in exile, and another has quit out of fear.*

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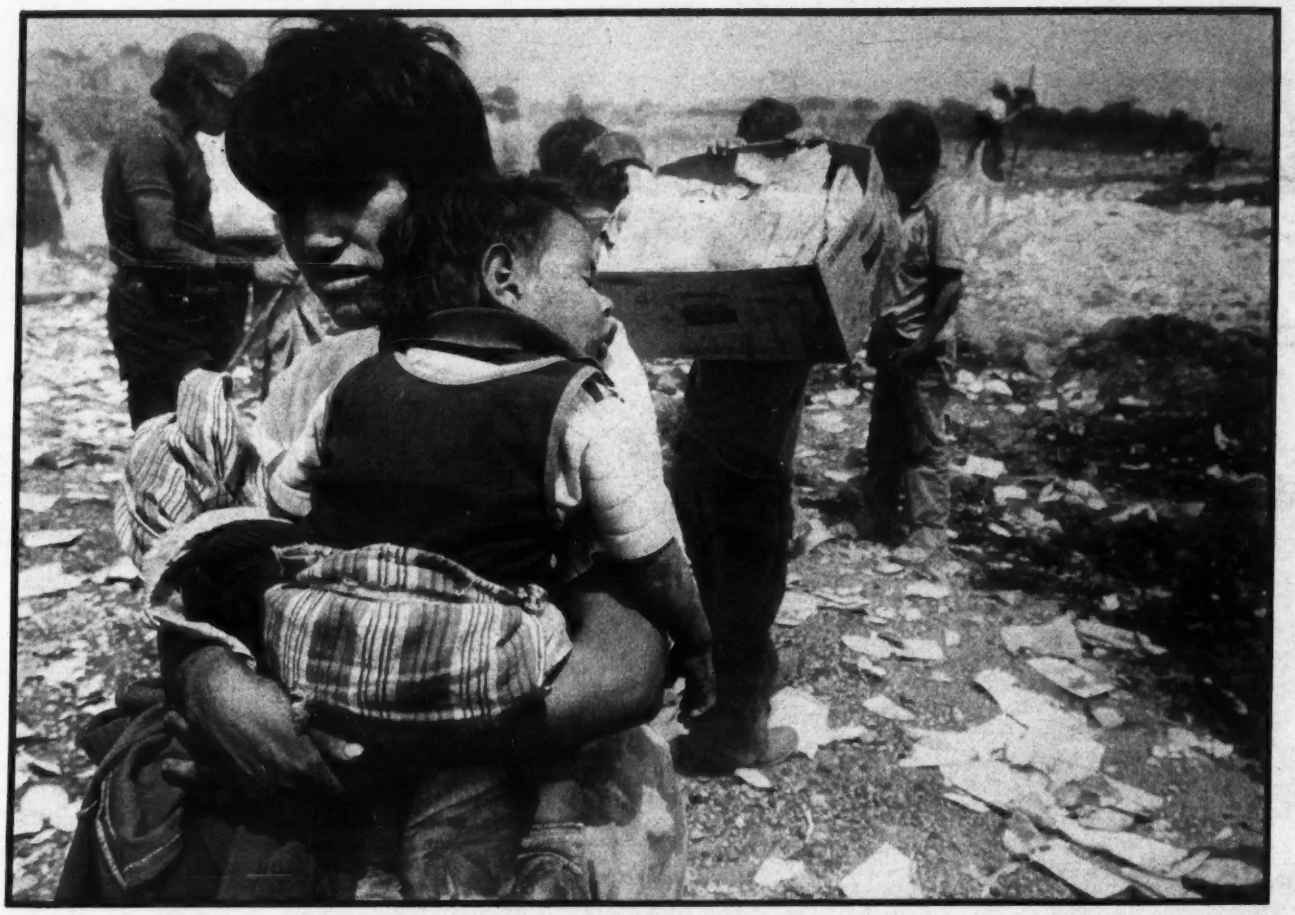

Guatemala City, the country's capital, is very beautiful, modern, and lively. In a room at one of the better hotels, it's possible to turn on HBO television, watch a movie, and imagine you're in Boston or New York. But another reality exists just below the surface of the modern city. There is the squalid poverty of the people living in the city's garbage dump, about half of whom are Indians who were displaced by the counterinsurgency campaign carried out in the countryside. There is the daily ritual of people going to the city morgue, looking for the bodies of "disappeared" relatives. The ever-present police, the identification checks, and the men carrying guns create the feeling of being under siege — a constant reminder that there is a war going on between the haves and the have nots, between the Guatemalan military and the Guatemalan people.

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Jay Maisel combines art and commerce

by Stuart Rosner

In this less than perfect world, everyone makes compromises. For photographers, the problems of maintaining a photographic identity are obvious: there is rent to pay, equipment to buy, endless supplies of film and paper to replenish, studios to maintain.

Still, somewhere out there lies that seemingly unattainable marriage of art and commerce. And there is no place on earth where commercially viable art is so richly rewarded as in New York. From the overtly commercial to the conceptually artistic, the roster of New York talent is extraordinary: Avedon, Penn, Hiro, Scavullo, Demarchlier, Heisler, the folks at Magnum. And the list goes on — on to Jay Maisel, the undisputed king of corporate photography.

Jay Maisel isn't known to the general public, since his work appears mostly in annual reports or in advertising, which is seldom credited in print. Although he has worked for magazines, he explains, "It was always easier for me to get work in advertising and now that it's easy to get magazine work I don't usually take it because I don't like the way they display the work. *Life*, for instance, practices what I call 'visual interruptus.' They have no respect for the editorial content of the magazine. Any good spreads are broken up for the cigarette and liquor ads."

Although he is involved in the less visible area of advertising and corporate photography, Maisel is highly regarded as a serious and dedicated shooter. Very much in demand, he is sometimes booked months in advance for assignments all over the world. Last year, he traveled twice to both the Orient and Europe and crisscrossed the country half a dozen times, for a total of about seven months away from home. Maisel immerses himself in his work with a level of enthusiasm that endears him to art directors worldwide.

Trying to distinguish between what Maisel does for love and for money is difficult, if not pointless. His insistence on making his own pictures during a shoot further blurs the boundaries between merely fulfilling an assignment and satisfying himself. Maisel regards a real photographer as "someone who, when he's done photographing [an assignment], should want to go out photographing." But make no mistake — advertising and corporate photography constitute big business, and in the crowded fishpond that is New York Jay Maisel is among the best-paid of the pros. His daily rate falls somewhere between $2000 and $10,000. Maisel is philosophical about his success in this fast-paced, high-paying world. "If one really feels they are successful," he wonders, "what does that mean? That you can stop, or that you have to keep doing exactly what you're doing? Either brings a certain kind of horror. Someone once said, 'If you think failure is tough, wait until you try success.' It can be measured in a lot of ways — money, fame — but I think real success comes with being involved with what you want to do, and doing it well."

Jay Maisel's good fortune in being able to do what he really wants to do goes a long way in explaining his incredible capacity for work. By his own admission, he "shoots more film than anyone I know. Shooting for me is an evolutionary process. As you shoot something, you begin to see more options, and the more you shoot, the more options you see. Some people are proud of how little film they shoot, but there's a million ways to do something, and if you lock yourself into one particular answer, all the other possible answers are out of your peripheral vision. You can't see them.

"I like to take at least two exposures of the same thing, because if it's worth taking a picture of, it's worth taking two. If something's really good, I have no hesitation about shooting a whole roll on one photo."

Indeed, Maisel's film consumption is just this side of legendary. In an average year, he says, "if I'm working a lot commercially, 5000 rolls would be just clearing my throat." He uses Kodachrome exclusively, and his staff has been known to scour Manhattan's camera shops for a satisfactory batch, sometimes buying as many as a thousand rolls at a time.

The base of operations for all this activity is Maisel's New York studio, or, more accurately, his bank. Nearly 20 years ago Maisel bought a bank building in the Bowery, thus providing himself with six vast floors of space, (about 2000 square feet per floor). At first, he rented out portions of the building to other artists — Roy Lichtenstein was an early tenant — but now Maisel and his photographs are the sole residents. The main floor of the building is the nerve center of the business, a cavernous room lined with file cabinets and filled with the miscellany of advertising: tear sheets, annual reports, slides, prints, magazine articles. The walls are hung with large, exquisite color prints of Maisel's choosing. There is also a backboard and basket where Maisel has been known to shoot a hoop or two to relieve anxiety or insomnia. Much of the task of running the Maisel enterprise is left to his staff of six, several of whom have been with him for years, two for as long as 15.

In 30 years of compulsive shooting, Maisel has amassed a file of a million slides. And that doesn't include the rejects, which he also keeps. There is an often-told story about Maisel's having come home late one night, a few years ago, to find someone going through his trash bags in search of discarded slides. Though he never determined whether the intruder was a neighborhood bum or a curious fellow photographer, Maisel now stores his rejected slides in large plastic garbage bags scattered around unused corners of the studio.

The cornerstone of Maisel's considerable collected works is "the vault," a 20-by-40-foot room in the basement of his studio. Maintained with a nearly military bearing, it is perhaps the best measure of the value Maisel puts on his work. A large, expensive

Continued on page 13

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Summer workshops

Lesson plans for photographers

by Gordon Talley

Photography is all about seeing, and a survey of New England photographic workshops probably should begin with visual descriptions. After all, the point of devoting a week or two of your summer entirely to taking and making pictures is to learn to see in new ways. Oddly though, I find myself recalling olfactory images in trying to describe the Ogunquit Photography School.

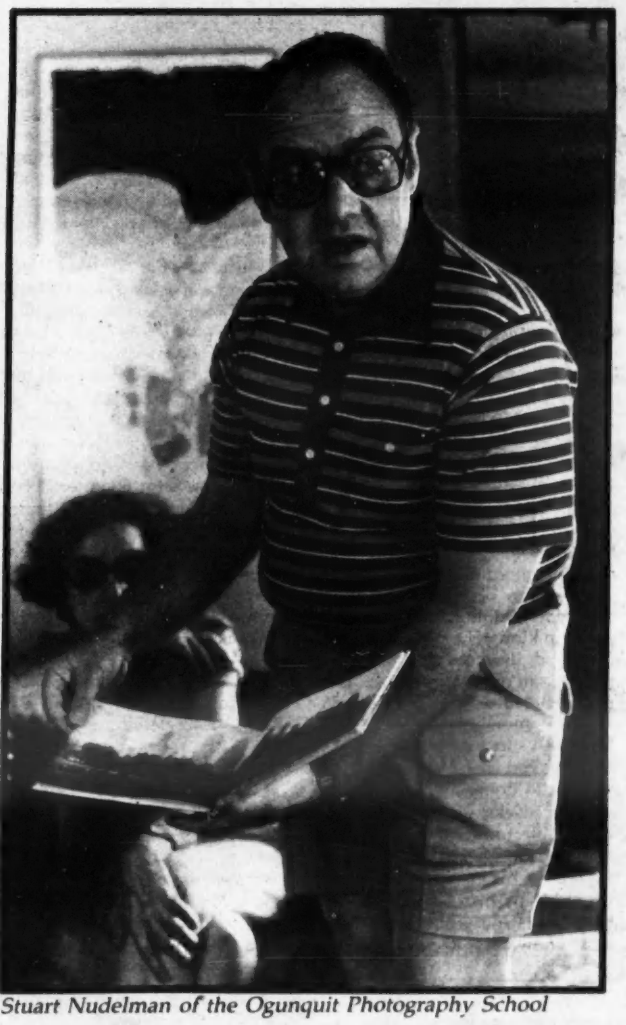
Breakfast. There is the aroma of freshly brewed coffee, and the warm-yeast smell of hand-sliced bread. Add to that the sweet scent of ham, the redolence of cheese, and the gamy flavor of liverwurst. For the 12 students who gather each week on summer mornings in the home of Stuart Nudelman, the founder of the Ogunquit workshops, breaking bread together becomes an integral part of the workshop experience. "Breakfast is comfortable," Nudelman says. "It's a process that accelerates learning."

Stuart Nudelman is one of a rare breed — he is a teacher who happens to love photography, rather than a photographer who makes ends meet by conducting occasional classes. When the Ogunquit School began, 16 summers ago, he introduced to photography the group-work techniques he uses as a guidance counselor in the New York City school system. Together with his wife, Eva, who is a private tutor during the academic year, Nudelman created "Photographic Sensitivity," the program at the center of the school's philosophy. The sensitivity seminar helps "photographers develop an awareness of photography as a means of indvidual expression," according to the school's catalogue. "Our goal," Nudelman adds, "is to get students to develop their inner resources." A dark, rather roly-poly man, he has a way of looking at his pupils as if he were inviting them to come out and play. Within a few hours after breakfast, students at the session I attended were sharing not only their personal photographic goals, but also their ways of seeing.

Every seminar at the Ogunquit School has a topic, but the course work, the teaching method, and even the photographic techniques used vary with each group. Well in advance of the class, Nudelman sends to each participant a questionnaire that includes such inquiries as, "Indicate what you feel to be your strengths and weaknesses in photography," and "What are your photographic goals?" Working from the replies, he devises a curriculum. "It's proper," Nudelman says, "to fulfill the needs of the student rather than coming in with our own objectives." The relaxed and supportive ambiance of the Ogunquit School makes it a natural choice for amateur photographers, who may feel limited by their visual vocabulary or unsure of new directions. "We make this commitment — " Nudelman pledges, "we'll take you from your present development to the next stage."

Last summer, Nudelman began using Polaroid instant slide film in the seminars. Upon returning from, say, a morning field trip to Maine coastal sites, students can develop their slides and begin discussing them a mere 20 minutes later. By afternoon, they may have taken new pictures and be comparing the finished results side by side with the morning's work. Nudelman often sets up photographic problems to be solved by each class member, using the same camera, lens, and film. "The only variables," he says, "are the students' creativity and ideas."

Each summer, the Ogunquit School offers four courses. This year, "Documentary Photography and Photojournalism" will run from July 29 through August 2, with Nudelman and guest instructors Isabel Lewando and B.A. King. "Creative Color" and "Experimental Color" workshops, running August 5 through 9, and 12 through 16, respectively, will feature Norman Rothschild, senior editor of *Popular Photography*. George Scurria will join Nudelman for "The Complete Portrait Workshop," August 19 through 23. Fees are $170 per session, and the school helps its students find housing. For a catalogue, write the Ogunquit Photography School, Box 568, Ogunquit, Maine 03907, or call (207) 646-7055.



GORDON TALLEY

Stuart Nudelman of the Ogunquit Photography School

* * *

The atmosphere at the Maine Photographic Workshops, in Rockport, couldn't be more different. The largest photographic workshop program in New England, the Maine Workshops will enroll 850 students this summer, in an educational environment that admissions director Carol Stevens describes as "intensive, exciting, crazy." It is, she says, a place to find "constant feedback and instruction, round the clock. Students eat, sleep, and drink photography."

Indicative of the fast pace at Rockport is the title of the one-week, basic black-and-white technique class: "Crash Course." Maine Photo Workshops also offers New England's most extensive list of big-name photographers teaching master classes. The line-up this summer includes Art Kane, Bruce Davidson, Paul Caponigro, Arnold Newman, Jay Maisel, and Eugene Richards, among others. Admission to these elite classes is by portfolio review only.

For the advanced amateur or the professional photographer with a well-established sense of personal vision, these critiques by photographic greats may provide the necessary push to move their work into the next stage. But one wonders if world-class photographers necessarily make good teachers. A couple of summers ago I sat in on the Maine Photo Workshops' evening slide show, which is open to the public. On that night, Ernst Haas was previewing the results of a photojournalism assignment in Nepal. After that, he showed a more personal series of pastel images of flowers. When the lights came up, a silence fell on the room. It was not the sort of quiet that descends upon an audience transported by beauty. Rather, I thought, it was characterized by mute recognition of the distance between disciple and master. Finally, a question came from the floor — a neophyte's. "What kind of camera did you use?" In response, Haas closed the question-and-answer session and walked out the door. The experience left me pondering the quality of teaching I might expect at the feet of "master" photographers.

To its credit, Maine Photographic Workshops offers a variety of classes, over 100 in the course of the summer, many of which are attuned to the needs of amateurs. Alternating with the crash technique course is another beginner's class called "Learning to See." Both are conducted by Maine Workshops instructors, not visiting professional photographers. There are also one- and two-week intermediate courses; photographers beyond that level might want to consider such classes as the "Portfolio" or "Personal Style" before facing the masters.

Classes at the Workshops

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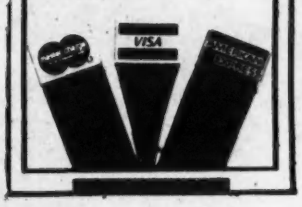

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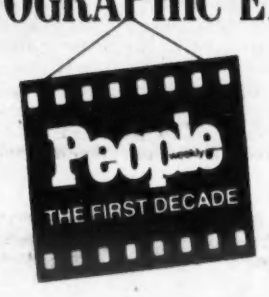

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Snap judgments

A report on new camera developments

by Gretje Gurevich

Maybe it all comes down to how much abuse you can tolerate. Do you really want a camera to tell you, out loud and in front of all your friends, to "load film," or "check distance"? Or what about one that beeps merrily when you have focused correctly? Or one that releases an unbidden flash in the middle of a darkened theater, just because it has decided there isn't enough light?

The key to avoiding such undesirable intrusions is knowing what you need from a camera. John Penney, store manager of Ferranti-Dege in Cambridge, suggests the prospective camera buyer make up a list of what he wants in a camera and then compare several different models that have those elements. He also believes it's a good idea to look at no more than two cameras at a time, especially if you have a tendency to be intimidated by the camera-buying process.

Penney mentions two important procedures to follow in determining which camera is for you. First, bring the camera body up to your eye. It should fit comfortably with your bone structure, and you should be able to see the data and any lights or colors that show up on the focusing screen. You should also be able to focus easily, and it should not be difficult for your eyes to adjust to the view finder. Second, hold the camera in your hand. Run all the switches, snap a few pictures, fiddle with the controls. See if it feels like you and the camera belong together.

Buying name brands ensures you service and performance. "With prestige comes polish," Penney explains. The best-known systems, such as Nikon, Pentax, or Minolta, have both equipment continuity and "muscle memory": when you add to the system, the camera still feels the same in your hand. If you change lenses, the glass contrast matches and the f-stop (aperture) positions remain constant. "Good camera systems treat amateurs professionally," he says.

But how do you weed through the mountains of photographic equipment currently available? For starters, the kind of photography you want to do will determine your basic needs. If you want snapshots of your family without spending much money or fiddling around with exposure controls, you might consider a Kodak Disc 3100 or a 110 pocket camera. If you do a lot of traveling and want a light camera that takes quality pictures a 35mm compact, such as the Canon MC, might be the best buy. But if you're into shooting, say, rhinoceros, an SLR (single-lens-reflex) camera that can be fitted with a long telephoto lens would be a wise choice. If you're interested in a camera with a bright screen, you'll want to check out a Minolta; if you want precision and silky motion, see what the Olympus system has to offer; and if you want a rugged camera that can withstand a lot of use and knocking around, consider a Nikon or a Canon. Below is a brief summary of what's available.

Consider the 110 pocket camera. According to Steve Tyminski, general manager of SBI Sales of Boston and Cambridge, these small, light, inexpensive (some as low as $14.95) automatic cameras have been designed "to put a camera into everyone's hands." But along with ease of use come problems of quality: the 110 exposure systems are often inadequate, and customers have found out that a lot of their rolls just don't "come out." The subsequent development of the simpler, more sophisticated disc cameras (many in the $30 to $40 range) has helped the situation somewhat; in some models the flash comes on as needed, the film rewinds automatically, and there may be a five-year, built-in battery. But there is one insurmountable barrier to really high-quality photographs with both the 110 and disc cameras: the negatives are extremely small, and the amount of enlargement needed to make prints is therefore much greater than that required for 35mm or 2¼ negatives. The result is a diffuse, grainy photograph. Penney notes that "the industry capitalized on people not knowing what quality really was."

One step up from the 110 and disc cameras are the light, easy-to-use 35mm cameras with advanced convenience features such as automatic focusing, motorized film wind and rewind,

Continued on page 10

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Camera

Continued from page 10

and built-in flash. One of the major differences between these and the 110s is the inclusion of a pressure plate for the film. These pressure plates, which cannot be used in 110s, provide good film resolution from corner to corner, and the larger negatives produce higher-quality prints.

These cameras do not have interchangeable lenses, and many have rangefinder focusing systems. This means that the photographer looks not directly through the lens at the subject but through an off-the-lens view finder. The disadvantage of this system is twofold. First, the photographer sees the subject at a slightly different angle than the one the lens sees. Second, the photographer is unable to check the effect depth of field will have on the photograph, which is possible with the through-the-lens focusing system of a single-lens-reflex camera. Although results may not please the more finicky photographers, these cameras are capable of producing snapshots of excellent quality.

Among the full-size rangefinder cameras, which cost from $129 to $199, are the Nikon L135AF, the Olympus Quick Flash AFL, and the Canon Sure Shot and Super Sure Shot. Compact rangefinders, which sell for $76 to $199, include the Canon MC, the Olympus XA, XA-2, and XA-1. Penney says all these are the most compact of the compacts. Also in this category is the Minolta AF-Sv Talker, which offers verbal instructions to those of us who don't already have enough back talk in our lives.

If you're looking for a camera that will provide you with more options and creative license than a fixed-lens camera affords, you will probably want to explore the world of single-lens reflex 35mm systems. The SLR has several advantages over the simpler cameras: you have a wide range of lenses to choose from; you focus and compose through the actual camera lens; and several types of exposure automation are available.

One type of exposure automation is "semi-automatic" or "manual exposure" control, in which the photographer adjusts the exposure settings until a moving needle or illuminated diode matches a marker or diode set by the camera's metering system. A second type is called "aperture-preferred" automation. This means that you set the lens aperture, and the camera automatically selects the shutter speed that will give the correct exposure. Another, less common alternative is "shutter-preferred" automation, in which the correct aperture is selected automatically after you have selected the shutter speed. According to the 1985 *Photography Buyer's Guide*, "Aperture-priority automation is more universally applicable to special accessory items (such as bellows-focusing units for close-up photography) and is favored for applications in which the camera is combined with microscopes and telescopes." Shutter priority would be useful if you do a lot of sports or fast-motion photography.

While checking out cameras with these features, keep in mind that it may be to your advantage to purchase one that gives you the option of bypassing the automatic system and setting the exposure controls by hand.

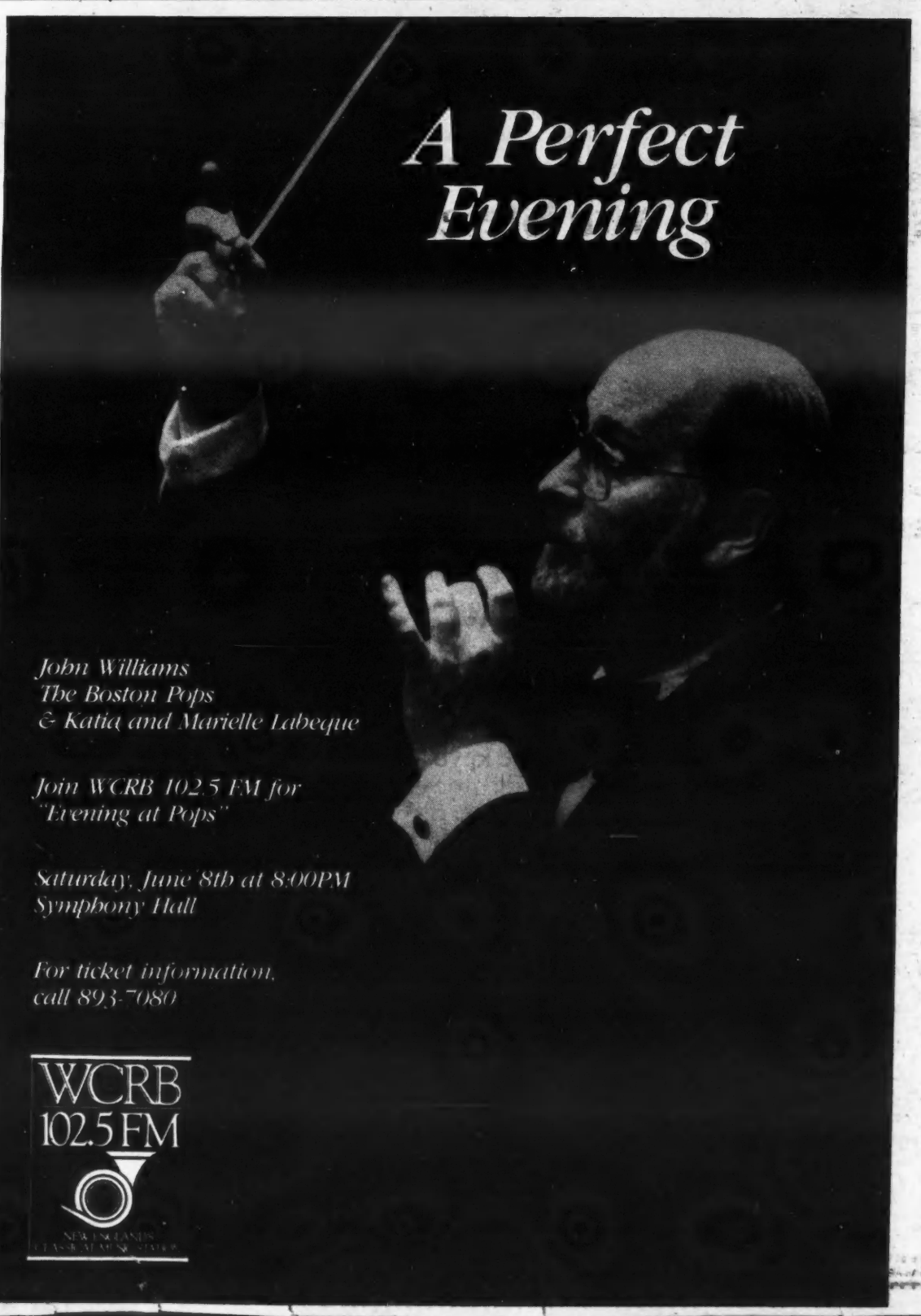
Another form of exposure is the P or "programmed" auto exposure (AE). Here, the camera is programmed to choose a combination of shutter speed and f-stop for each subject. The photographer need only set the correct film speed index number (ISO), and the camera will do the rest. Accoring to the *Buyer's Guide*, 16 models currently offer automation as one of their exposure modes. These are: the Canon A-1, AE-1 Program, T-50, T-70; the Chinon CP-5 and CP-5s; the Fujica AX-5; the Konica FP-1; the Leica R4; the Mamiya ZE-X; the Minolta X-700; the Nikon FG and FA, the Olympus OM-2s; and the Pentax Super Program and Program Plus.

Some SLRs combine shutter and aperture priority with automatic and manual modes, thus allowing the photographer to switch from one exposure control to another. These multi-mode SLRs are a manual camera, a priority camera, and a programmable camera all in one. They include the Canon A-1, Fujica AX-5, Chinon CP-5, Leica R4, Nikon FA, and Pentax Super Program. Their prices range from $521 to $2000; included in the package is a 50mm lens.

So what's left to invent? The big news these days is that Minolta and Canon have come out with cameras whose major selling point is autofocusing. This means that the autofocus feature, which was previously a feature only of fixed-lens cameras, has now been added to cameras with interchangeable lenses. "The world's only built-in autofocus SLR system," is how Minolta describes its new Maxxum. With the Maxxum you just compose and shoot. The system includes 12 autofocus lenses. The Maxxum automatically sets the right program for the focal lens you're using and changes automatically even when you zoom from wide-angle to telephoto. You can also choose a manual mode, aperture priority, or shutter priority. The price of the Maxxum has been quoted as ranging from $320 to $330, including a 50mm f/1.7 lens.

Canon's new creation is the T20 (quoted at $379), which snaps your subject into focus with a touch of the shutter button. Subjects may be moving or stationary, at infinity, or as close as 15 inches. Three autofocus lenses are available with the T80: a regular lens (Canon AC 50mm f/1.8) and two zoom lenses (Canon AC 75-200mm f/4.5 and 35-70mm f/3.5-4.5). The entire line of more than 50 Canon lenses may be used with the T-80 and, with the exception of the autofocus, can make use of all the T80 functions (a picture selector, which lets you choose whether you want everything in focus or a blurred background, a built-in power winder, and an automatic-programmed flash). When you focus manually, the machine will let out a little beep (referred to in the ads as "an audible focus-confirmation signal") to let you know you've used it correctly. The detectives among us should go in for the Maxxum — at least it keeps quiet.

Reaction to the Maxxum from within the industry seems to be favorable. In the April issue of *Modern Photography*, one article critical of noninterchangeable-lens autofocus cameras says,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Popular Photography, however, expresses concern over the Canon T80, which includes only a manual ISO and shutter speeds from 12 to 1600. Since Fuji and Konica are already supplying film with ISO 1600, a range of 6400 would seem more appropriate. A user's report of the T80 will appear in the June issue of *Peterson's Photographic*. Meanwhile, *Photographic* says, "Forget tedious photography classes — the T80 is a shortcut to photographic proficiency, intelligence you can buy."

Where can you get these wonderful machines? Of 11 stores in the Boston area, only one had the T80 in stock; the rest said they were either sold out or hadn't received them yet. Most stores said they expected delivery within a few weeks. One retailer said he sold the T80s as soon as they came in. As for the Maxxum, only two stores had any in stock. Lechmere has a waiting list for them of more than 30 names; still, you have a good chance of getting a Maxxum if you call and reserve one. An employee at a Newton camera shop said, "Minolta grossly underestimated the number that would be sold."

That could be. But Steve Tyminski wonders if it's possible that the industry is creating its own shortage to make these cameras more desirable. We have yet to see whether the T80 and the Maxxum will be the Cabbage Patch Kids of photography. □

Workshops

Continued from page 7

begin June 2 and run through October 5. For master classes, especially, it's best to register early. Fees range from $285 to $1000. Room and board are available in the Workshops' residence halls. For a catalogue, write the Maine Photographic Workshops, Rockport, Maine 04856, or call (207) 236-8581.

• • •

Vermont's Zone VI Workshops, I had originally assumed, would concentrate on large-format photography, the specialty of workshop founder Fred Picker. I learned otherwise, though. "It's not all roots and rocks," Picker says. "And it's not true all the staff does what I do."

Each morning, approximately 70 students gather in a lecture hall on the campus of the Putney School, for a combined class in which Picker discusses technical or aesthetic subjects applicable to all course work. Then, in the afternoons, the class breaks down into small groups, each of which is led by one of eight Zone VI instructors. The instructors rotate, and by the end of the week-long session, students will have worked on large exhibit prints with Picker and on color documentary, 35mm techniques, and other topics with assistants.

"You can no more learn to be a photographer in seven days than learn to be a cellist," says Picker. "I try to show students how to approach a problem, how to look at an area and see what the problem is. Students who came thinking they wanted to know the specifics — how long to develop in D-76 — find out they know how to solve things."

Summer sessions at Zone VI run from August 3 through 10 and 11 through 18. Fees are $795 and room and board are included. For information write Zone VI Studios, Newfane, Vermont 05345, or call (802) 257-5161.

• • •

If morning fog, rock pools, and windswept farms appeal to you, Katherine A. Rose of the Martha's Vineyard School of Photography has the program you're looking for. "We tend to get the serious amateur," she says, "who uses the island landscape as the subject."

As in many smaller workshops, the students' levels of ability vary greatly in any given Vineyard School session. Consequently, the school emphasizes small classes (three to 10 students), individual instruction, and field work. One- and two-week sessions in both black-and-white and color techniques begin on June 30 and run through September 1. There will be 11 instructors over the summer, including Eugene Richards, Neil Rennie, and Dave Doubley (who works in dye-transfer and color-separation processes).

This was the only workshop that made a point of mentioning that it welcomes teenagers (though Maine Photo Workshops also offers one teenage class in July). Fees range from $150 to $375. Accommodations are in local bed-and-breakfast lodgings. Information is available from Martha's Vineyard School of Photography, Box 910, Vineyard Haven 02568, (617) 693-2170.

• • •

The Chilmark Photography Workshop, also on Martha's Vineyard, enters its 12th season this summer with two 10-day sessions, July 1 through 10 and 13 through 22. According to director Carol Lazar, the curriculum will cover the gamut: camera and darkroom techniques, field work, photojournalism, and portraiture. Every evening a staff of notable photographers offers insights into their own work. Among discussion leaders this summer are Larry Fink, Charles Gatewood, Mark Chester, Charles Traub, and Jerry Gordon. Classes are limited to 12 students. Fees are $465 for one session, $750 for both. Accommodations (breakfast and lunch included) are available at $295 per session. For a brochure, contact Chilmark Photography Workshop, 75 Central Park West, New York, New York 10023, (212) 362-6739.

• • •

If your bent is botany, the David M. Stone Photographic Workshops, on Cape Cod, offers

Continued on page 12

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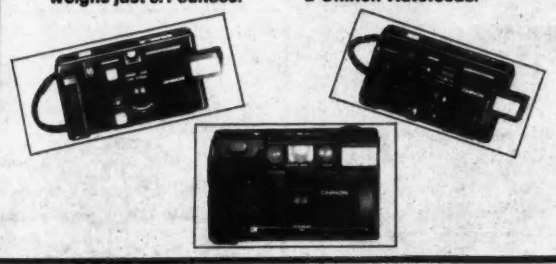

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Workshops

Continued from page 11

three sessions, which are team-taught by a professional stock photographer specializing in nature and wildlife pictures, and by two botanical experts. Photographer Stone expects about eight students per course, and each should be thoroughly familiar with 35mm technique. As at the Ogunquit workshops, Polaroid slide film will allow same-day critiques of photographs.

Field-work subjects include, from June 4 through 7, the shore birds of Monomoy Island; from July 23 through 26, the blooming of the rare Plymouth gentian; and from September 10 through 13, fall-blooming plants in the salt marshes of Washburn Island. Fees are $400, and they include board and Spartan accommodations in a renovated marine field station. A 10 percent discount is given for early registration. Write to David M. Stone Photographic Workshops, 7 Granston Way, Buzzard's Bay 02532, or call (617) 759-9666.

* * *

If your scientific inclinations lean more toward physics than nature studies, the Massachusetts Institute of Technology offers "Techniques in High-Speed Photography and Videography." The photographic work here is highly precise, and the photographers are mostly involved in various types of photo-instrumentation for government testing. But the work is far from dry; having seen some of the images produced by the session's instructors, Harold E. Edgerton and C.E. Miller, I can testify that the aesthetics of the photos are a joy to behold.

Every time orange juice sloshes, in sensual slow motion, into a glass on TV, credit is due to Dr. Edgerton. He was the first to show us, in the 1930s, what a drop of milk looks like when it splashes (it resembles a crown) and how the principle of inertia applies to a football kickoff (the dust on the ball is left behind). In this summer's workshop, Edgerton and Miller will open the MIT labs so that students can use specialized equipment to conduct 12 experiments in high-speed photography. Among the techniques to be studied are streak photography (which allows stop-action pictures in available light), schlieren photography (which makes shock waves visible), and video imaging at the equivalent of several million frames per second.

"The nice thing about this course," says Miller, "is that it's a real hands-on thing. You can use the equipment and take the results home. We're not just a dog-and-pony show." The fee, including materials, is $850 for the week-long session, June 10 through 14, and housing is available. For information, write Summer Session E19-356, Massachusetts Institute of Technology, Cambridge 02139, or call (617) 253-4629.

* * *

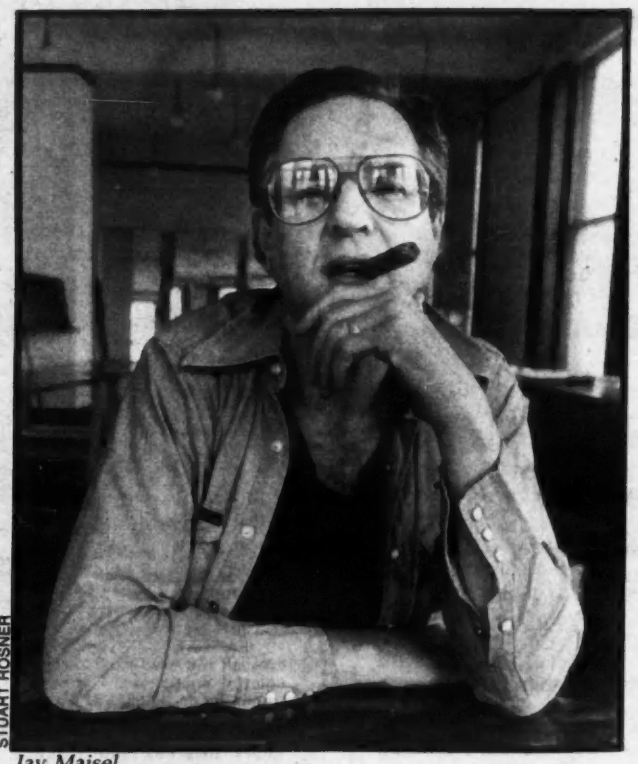
Going to summer workshops can be so much fun that some people want to lead them. This year Leight Johnson, a veteran student of the Maine Photo Workshops and Zone VI, among others, will launch the Middlebury Workshop in Vermont. He offers a 24-hour darkroom and personal instruction in black-and-white basics. Visiting teachers are Sharon Fox, for "Photographic Vision," and Penney Feldman Hubbard for "Color Camera Fundamentals." Week-long classes, from July 1 through August 30, are limited to 10 students. The fee is $250, plus $50 for materials. Bed-and-breakfast accommodations are available. Write for a brochure to the Middlebury Workshop, RD #1, Middlebury, Vermont 05753, or

call (802) 388-6156.

* * *

No overview of New England summer workshops would be complete without mention of the fare further afield. Every year Ogunquit School offers a "Roving Eye Traveling Workshop"; this summer it will take place on Maine's Monhegan Island. An entire catalogue of classes offered is available from the Maine Photographic Workshops. Or, consider the Ireland Photographic Workshops, which meets for two weeks in a modernized guest house on Clew Bay in County Mayo. Ron Rosenstock, who has conducted the workshop for 15 years, was a student of Minor White and Paul Caponigro. Sessions begin in May and run sporadically until mid-October. The fee of $1875 includes airfare, room, and board. Details are available from Ireland Photographic Workshops, 91 Sunnyside Avenue, Holden 01520, (617) 829-6052.

Finally, if you have to stay close to home this summer, look into the offerings of the Boston and Cambridge adult education centers. (I took a weekend "Zone System" course at Cambridge Adult that made comprehensible several years of fruitless reading of Ansel Adams.) Catalogues for these centers are widely distributed. □



STUART ROSNER

Jay Maisel

Maisel

Continued from page 6

climate-control unit hums quietly in the corner, perpetually protecting the works stored within. The floor-to-ceiling filing cabinets, some glass-enclosed, are filled with hundreds of boxes of slides, neatly marked with subject, shooting dates and locales, and other specific data. This is where Maisel spends huge amounts of time editing his collection.

One open box reveals colored slashes of an editing pen on each slide, like pith rings of a tree, indicating the number of cuts the slide has survived in other rounds with Maisel as editor. If even a small fraction of these transparencies approaches the quality of images hanging elsewhere in his studio, then the cumulative achievement of this man's work is staggering.

Maisel began his photography career in the '50s, shooting in black and white, and today has some 5000 rolls of unprinted black-and-white film stored in the vault. His passion for taking photographs eventually led him away from black and white and into the world of color. He found that by not having to spend hours in the darkroom, processing and printing negatives, he could spend more time shooting pictures.

But there were other considerations as well. "Black and white," Maisel explains, "becomes an abstraction of what's out there, and I'd rather deal with what's really out there. I make no apologies for the pure joy of color for its own sake. I speak out for the joy of yellows, the passion of reds, the moods of blues. I love color and am aware of the seductive dangers it poses to photographers, but what's wrong with a little seduction? Color is ultimately the thing that fascinates every artist. We are involved with line, shape, form, and gesture — and you can do a million things without color, but once you introduce it, color takes center stage. I know this may sound like heresy, but no amount of lab work will ever create a meaningful image unless it was there at the moment of exposure."

Consistent with this philosophy, Maisel only uses filters when he is forced to deal with different types of artificial light for commercial assignments. Usually, he waits for the light instead. The brilliance of color in his photos is more a function of searching for "those juxtapositions [of color] that I've seen the least of, and trying to avoid the predictable. When out shooting you often gain more by waiting than by walking."

Maisel's photographs are, in a word, beautiful. His subject matter is the everday and the familiar: landscapes, cityscapes, all kinds of people, an occasional sunset. Yet he manages to extract from this moments of dazzling simplicity. "There is chaos everywhere," he says, "but I have no responsibility to reflect this. I have the privilege, the obligation to pick what I like and work with that. I can show garbage, or I can not show garbage. I can show beauty, or I can show tragedy. The choice is mine." Maisel's work represents a kind of idealized snapshot ethic — beautiful, unhurried, well-considered compositions of flawless color, which, though somewhat romantic, serve as an accurate, unmanipulated record of a particular place and time.

Maisel considers the question of his personal style. "Style," he says, "is something that you don't apply on top of something; it occurs as the result of everything else. You can go out and get dressed in a certain style, but that's something you went out and bought. In photography you can't buy style. What I hope for in my pictures is a quality of light that one would find exciting, one that is aesthetically beautiful. I would also hope that there's a quality in terms of information, that the thing I've shot is rendered well. And I would hope there is a combination of form and content that makes the thing work. I think these are the three aspects of the picture: the form, the content, and the combination of the two. You can get by with one, but, it's better with two, and it's best with three. I don't get all three all the time, by any means, but that's what I'm always looking for. I'd like to hit you high and low — in the heart and in the head. A really good picture appeals to you on both those levels."

On the second floor of Maisel's bank building there is a gallery space where he has hung a selection of his favorite images. The extraordinary clarity of each photograph, the richness of texture, the pulsating luminosity are evidence of the fundamental respect Maisel has for the tools of his trade. But it is in the dye-transfer print that Maisel has truly found his medium. Professional photographers have long extolled the virtues of Kodachrome as the superior color film. With the optics for 35mm cameras surpassing themselves year after year, and Maisel's own intuitive feeling for light, Maisel is changing our understanding of what is possible in reproducing a color image. He's like the kid standing next to his hot rod saying, "Okay, let's see what this baby can do." With more and more frequency, he is selling signed, single-edition, dye-transfers to galleries and collectors.

It is interesting to compare

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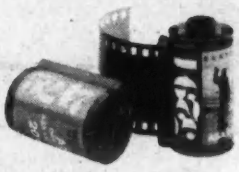
35mm Color



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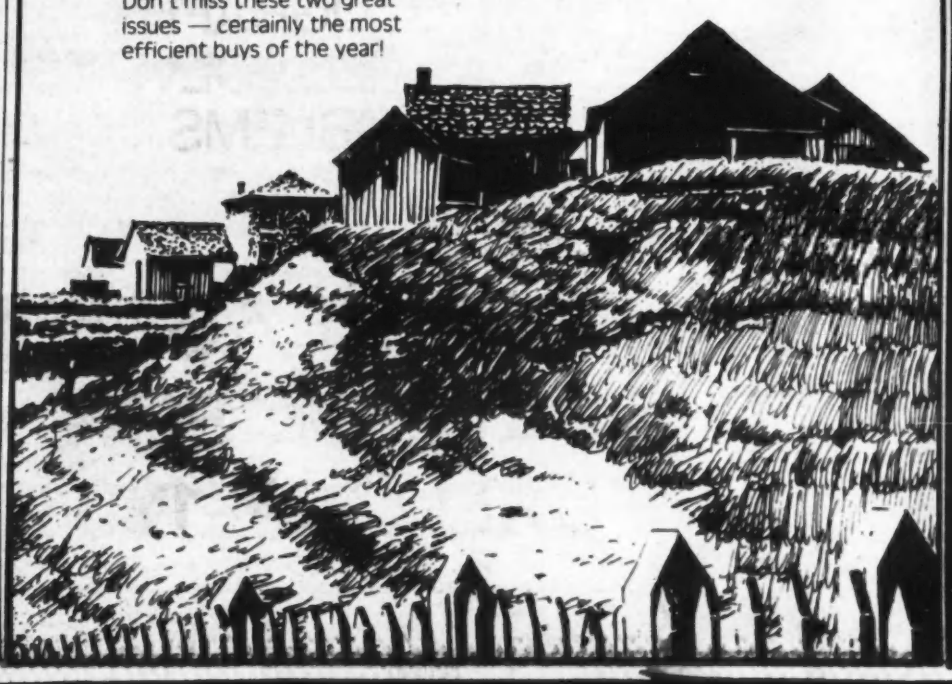

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Maisel

Continued from page 13

Maisel's work with that of other eminent color photographers, if more for the differences than for the similarities. One could put him in a class with Ernst Haas, Pete Turner, and Joel Meyerowitz; not surprisingly, they are all close friends. Turner, like Maisel, often has his work cloaked in the anonymity of advertising, but he is an original whose vision and experiments with color filtration and image sandwiching have set the standard for nearly everyone working in color today.

Meyerowitz and Haas not only enjoyed commercial success, but are well known in art circles for the many thematic books they've published. "People like Meyerowitz," Maisel says, "might take a theme and concentrate on it for a very condensed and specific period of time, and then they won't go back and do it again. I've found that I may have sporadic bursts of something, but I will take a theme and continually rework it; it is always being refined. It's like what Pete [Turner] does: he'll take a picture and start reworking it, and 10 or 20 years from now he'll be reworking the same picture, and still be doing more incredible things with it.

"I may have themes, but I can't come up with any one at a given time; I have trouble with that. Someone came to me recently and proposed a topic for a book that was more conceptual in its approach, less oriented to subject. Haas's *The Creation* is like that. What a brilliant stroke of genius: the creation as a concept for a book. I wish I could come up with something like that, because what he did was to take a body of his work and apply a label to it. Then he was able to shoot more to fit the concept. I'd like people to know more of my personal work and, hopefully, in the next few years it will appear. But I can't be too concerned with that or I'll go whacko like people who need continually to have museum exhibitions or to publish books. That would take my concentration off shooting. It's basically politics versus substance."

Maisel is even more forceful when it comes to the work-for-hire problem confronting all photographers. It is a system, he feels, that will sound a death knell for the industry if photographers don't take a unified stand to oppose it. Work for hire basically means that a photographer is hired by an agency or corporation to shoot a job at an agreed-upon day rate, plus expenses. Under the agreement, the photographer turns over all the pictures taken on assignment to the client, keeping nothing for himself for use as potential stock. As Maisel argues, work-for-hire will have the effect of diminishing not only stock sales, but also the number of overall assignments. If photographs are owned outright by an aggregate of corporate clientele or their surrogates, where's the need to buy picutres?

The hidden danger in work-for-hire arrangements lies in the electronics revolution, which will easily facilitate the combination of two or more photographs to create a new and, therefore, reusable image. "Don't cut your own throats," Maisel warns photographers; "the images are yours — don't give them away."

For all his strong opinions, Jay Maisel, photographer, businessman, corporate communicator, and craftsman extraordinaire can most often be found, when not on assignment, prowling the early-morning streets of New York, taking pictures. I still *love* to take pictures. That's where the fun's at." □

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The retail and wholesale photo-finishing industry has experienced dramatic growth in recent years and promises to continue this growth in years to come. With the advent of new technologies, lab owners, particularly mini-lab owners, are faced with a growing need for qualified help. The demand for technicians able to work efficiently and independently and who can handle general management and customer relations has become greater than ever.

The New England School of Photography has been in photographic education since 1968, offering vocational training programs geared toward photographic professionalism. Photo Lab Management has been designed to supply the growing photo-finishing industry with a reservoir of skilled personnel. It is designed for motivated individuals seeking growth positions in this rapidly expanding field. It will also prepare students for opportunities in other areas such as commercial and custom labs as well as providing a solid technical background for professionals already in sales and photo-marketing.

New England School of Photography

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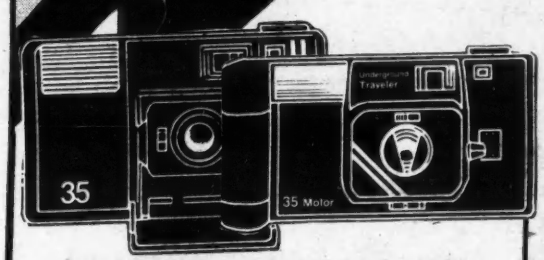

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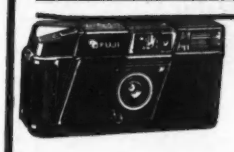

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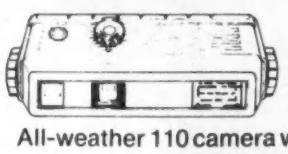

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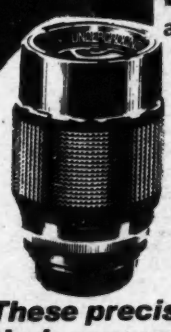

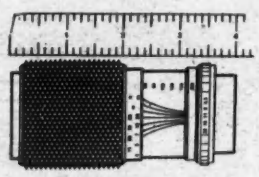

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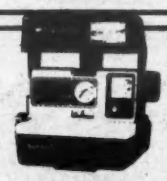

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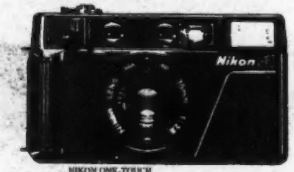

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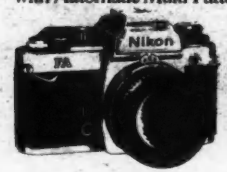

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